ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

**APPLICANT(s)** (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Humax Co., Ltd., Seongnam-si, KOREA, REPUBLIC OF;
Tae Gap KIM, Seongnam-si, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.
PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

or Fax
(571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22429 7590 10/19/2015
HAUPTMAN HAM, LLP
2318 Mill Road
Suite 1400
ALEXANDRIA, VA 22314

APPLICATION NO. 14/174,163
FILING DATE 02/06/2014
FIRST NAMED INVENTOR Tae Gap KIM
ATTORNEY DOCKET NO. 5607-0002
CONFIRMATION NO. 6315

TITLE OF INVENTION: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

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EXAMINER TRAN, HAI V
ART UNIT 2423
CLASS-SUBCLASS 725-038000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
   - Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
   - "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
   1. Hauptman Ham, LLP

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

   PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

   (A) NAME OF ASSIGNEE
   HUMAX CO., LTD.

   (B) RESIDENCE: (CITY and STATE OR COUNTRY)
   SEONGNAM-SI, GYEOGGI-DO
   REPUBLIC OF KOREA

   Please check the appropriate assignee category or categories (will not be printed on the patent):
   [ ] Individual [ ] Corporation or other private group entity [ ] Government

4a. The following fee(s) are submitted:
   [ ] Issue Fee
   [ ] Publication Fee (No small entity discount permitted)
   [ ] Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
   [ ] A check is enclosed.
   [ ] Payment by credit card. Form PTO-2038 is attached.
   [ ] The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 07-1337 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
   [ ] Applicant certifying micro entity status. See 37 CFR 1.29
   [ ] Applicant asserting small entity status. See 37 CFR 1.27
   [ ] Applicant changing to regular undiscounted fee status.

   NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
   NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

   NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

[ ] Applicant certifying small entity status. See 37 CFR 1.29
[ ] Applicant asserting micro entity status. See 37 CFR 1.27
[ ] Applicant changing to regular discounted fee status.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Approved Signature /Yoon S. Ham/
Typed or printed name Yoon S. Ham
Date January 19, 2016
Registration No. 45,307
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**Electronic Acknowledgement Receipt**

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<td><strong>Confirmation Number:</strong></td>
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<td>METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE</td>
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<td><strong>First Named Inventor/Applicant Name:</strong></td>
<td>Tae Gap KIM</td>
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<td><strong>Customer Number:</strong></td>
<td>22429</td>
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<td><strong>Filer:</strong></td>
<td>Yoon Ham</td>
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<td><strong>Filer Authorized By:</strong></td>
<td></td>
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**Payment information:**

- **Submitted with Payment:** yes
- **Payment Type:** Credit Card
- **Payment was successfully received in RAM:** $960
- **RAM confirmation Number:** 4617
- **Deposit Account:** 071337
- **Authorized User:** HAM, YOON S

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

- Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)
- Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
NOTICE OF ALLOWANCE AND FEE(S) DUE

HAUPTMAN HAM, LLP
2318 Mill Road
Suite 1400
ALEXANDRIA, VA 22314

EXAMINER
TRAN, HAI V

ART UNIT
PAPER NUMBER
2423

DATE MAILED: 10/19/2015

APPLICATION NO.
14/174,163
FILING DATE
02/06/2014
FIRST NAMED INVENTOR
Taeg Kim
ATTORNEY DOCKET NO.
5607-0002
CONFIRMATION NO.
6315

TITLE OF INVENTION: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

APPLN. TYPE
nonprovisional
ENTITY STATUS
UNDISCOUNTED
ISSUE FEE DUE
$960
PUBLICATION FEE DUE
$0
PREV. PAID ISSUE FEE
$0
TOTAL FEE(S) DUE
$960
DATE DUE
01/19/2016

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.
PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

or Fax
(571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate “FEE ADDRESS” for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22429 7590 10/19/2015
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APPLICATION NO.  FILING DATE  FIRST NAMED INVENTOR  ATTORNEY DOCKET NO.  CONFIRMATION NO.

14/174,163  02/06/2014  Tae Gap KIM  5607-0002  6315

TITLE OF INVENTION: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE

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EXAMINER  ART UNIT  CLASS-SUBCLASS

TRAN, HAI V  2423  725-038000

1. Change of correspondence address or indication of “Fee Address” (37 CFR 1.363).
   - Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
   - “Fee Address” indication (or “Fee Address” Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
   (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
   (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

   PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordanation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

   (A) NAME OF ASSIGNEE
   (B) RESIDENCE: (CITY and STATE OR COUNTRY)

   Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:
   - Issue Fee
   - Publication Fee (No small entity discount permitted)
   - Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
   - A check is enclosed.
   - Payment by credit card. Form PTO-2038 is attached.
   - The director hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number ____________ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
   - Applicant certifying micro entity status. See 37 CFR 1.29
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   - Applicant changing to regular undiscounted fee status.

   NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. NOE: If the application was previously under micro entity status, checking this box will be taken to be a notification of lost of entitlement to small or micro entity status, as applicable.

   NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

   NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature ___________________________________________ Date ____________________________

Typed or printed name ____________________________________________ Registration No. ____________________
Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.
The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number’s legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency’s responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
Examiner-Initiated Interview Summary

Application No. 14/174,163
Applicant(s) KIM, TAE GAP
Examiner HAI V. TRAN
Art Unit 2423

All participants (applicant, applicant’s representative, PTO personnel):

(1) HAI V. TRAN.
(2) Byung Le
(3) 
(4) 

Date of Interview: 29 September 2015.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant’s representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.

Issues Discussed ☑ 101 ☑ 112 ☑ 102 ☑ 103 ☑ Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1 and 9.

Identification of prior art discussed: Prior art of record.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed Applicant’s remarks (09/21/2015) and Examiner suggests Applicant to amend the claims according to Applicant’s invention as shown in Applicant’s Fig. 8 and disclosure page 18 lines 24-page 19 line 12 so to place the application in condition for allowance. On 09/30/2015, Applicant agrees with the Examiner suggestion and allows the Examiner to do an examiner’s amendment.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/HAI V. TRAN/
Primary Examiner, Art Unit 2423

U.S. Patent and Trademark Office
PTOL-413B (Rev. 8/11/2010)
Notice of Allowability

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 09/21/2015.
   □ A declaration(s)/affidavit(s) under 37 CFR 1.130(b) was/were filed on ______.

2. □ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-5, 7-13 and 15-17. As a result of the allowed claim(s), you may be eligible to benefit from the Patent Prosecution Highway program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPH-feedback@uspto.gov.

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:
   a) ☑ All   b) □ Some   c) □ None of the:
   1. ☑ Certified copies of the priority documents have been received.
   2. □ Certified copies of the priority documents have been received in Application No. _____.
   3. □ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. □ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   □ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ______.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. □ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)
1. □ Notice of References Cited (PTO-892)  5. ☑ Examiner's Amendment/Comment
2. □ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ______  6. ☑ Examiner's Statement of Reasons for Allowance
3. ☑ Examiner's Comment Regarding Requirement for Deposit of Biological Material  7. □ Other _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date 09/29/2015.

/HAI V. TRAN/
Primary Examiner, Art Unit 2423

Notice of Allowability Part of Paper No./Mail Date 20150930
The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant’s submission filed on 09/21/2015 has been entered.

EXAMINER’S AMENDMENT

An examiner’s amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner’s amendment was given in a telephone interview with Byung Lee (73456) on 09/30/2015.

The application has been amended based on the amendment filed on 09/21/2015 as follows:
Claims 1 and 9 have been amended.

Claims 6, 14 and 18-20 have been Canceled.

1. (Currently Amended) A method for switching channels carried out by a media play apparatus, the method comprising:

obtaining channel information about a plurality of channels;

receiving a channel switching signal; and

generating channel data according to the channel switching signal by using the obtained channel information,

wherein the channel information is included in a transport stream of a currently received channel including a program association table (PAT), and

the PAT includes (i) transport stream identifiers identifying the transport stream(s) of the currently received channel and other transport streams of other channels, and (ii) an actual transport stream flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers.

9. (Currently Amended) An apparatus for switching channels of a media play apparatus, the apparatus for switching channels comprising:

at least one tuner for obtaining channel information about a plurality of channels;

and

a controller for extracting the obtained channel information, and
generating channel data according to a received channel switching signal by using the previously obtained channel information,

wherein the channel information is included in a transport stream of a currently received channel including a program association table (PAT), and

the PAT includes (i) transport stream identifiers identifying the transport stream[s] of the currently received channel and other transport streams of other channels, and (ii) an actual transport stream flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers.

Allowable Subject Matter

Claims 1-5, 7-13, 15-17 are allowed.

The following is an examiner's statement of reasons for allowance:

Independent Claims 1 and 9 are considered allowable since when reading the claims in light of the specification (see Applicant's specification Fig. 8-9 and pages 18 lines 24- page 19 lines 12, as per MPEP §2111.01 or In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385,388 (Fed. Cir. 1983), none of the references of record alone or in combination disclose or suggest the combination of all limitations specified in Independent Claims 1 and 9.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably
accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAI V. TRAN whose telephone number is (571)272-7305. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, BENJAMIN BRUCKART can be reached on (571)272-3982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HAI V. TRAN/
Primary Examiner, Art Unit 2423
**Examiner-Initiated Interview Summary**

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<td>HAI V. TRAN</td>
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All participants (applicant, applicant’s representative, PTO personnel):

(1) **HAI V. TRAN**.

(2) **Byung Le**.

Date of Interview: **29 September 2015**.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant’s representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.

Issues Discussed: ☑ 101 ☑ 112 ☑ 102 ☑ 103 ☑ Others

(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: **1 and 9**.

Identification of prior art discussed: **Prior art of record**.

Substance of Interview

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

*Discussed Applicant’s remarks (09/21/2015) and Examiner suggests Applicant to amend the claims according to Applicant’s invention as shown in Applicant’s Fig. 8 and disclosure page 18 lines 24-page 19 line 12 so to place the application in condition for allowance. On 09/30/2015, Applicant agrees with the Examiner suggestion and allows the Examiner to do an examiner’s amendment.*

**Applicant recodarion instructions**: It is not necessary for applicant to provide a separate recodarion of the substance of interview.

**Examiner recodarion instructions**: Examiners must summarize the substance of any interview of record. A complete and proper recodarion of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recodarion including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/HAI V. TRAN/
Primary Examiner, Art Unit 2423
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/RYAN STRONCZER/
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**APPLICANTS**
Humax Co., Ltd., Seongnam-si, KOREA, REPUBLIC OF;

**INVENTORS**
Tae Gap KIM, Seongnam-si, KOREA, REPUBLIC OF;

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HAUPTMAN HAM, LLP
2318 Mill Road
Suite 1400
ALEXANDRIA, VA 22314
UNITED STATES

**TITLE**
METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

**FILING FEE RECEIVED**
1600

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(Primary Examiner)  (Date)

/HAI V TRAN/  09/30/2015  O.G. Print Claim(s)  O.G. Print Figure
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**NONE**

(Secondary Examiner)

(Primary Examiner)

**Total Claims Allowed:**

15

09/30/2015

1

8
REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number 14174163
Filing Date 2014-02-06
Docket Number (if applicable) 5607-0002
Art Unit 2423

First Named Inventor Tae Gap KIM
Examiner Name TRAN, HAI V

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on ____________

☐ Other

☒ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months ____________

(Peiod of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months ____________

(Peiod of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Depoost Account No 071337

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature
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This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
**Electronic Patent Application Fee Transmittal**

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**Filing Fees for Utility under 35 USC 111(a)**

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- **Payment Type**: Credit Card
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- **Deposit Account**: 071337
- **Authorized User**: HAM, YOON S

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:
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**Warnings:**

This is not a USPTO supplied RCE SB30 form.

**Information:**

| Total Files Size (in bytes): | 164918 |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
Docket No.: 5607-0002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: 

Tae Gap KIM: Confirmation No.: 6315

U.S. Patent Application No. 14/174,163: Group Art Unit: 2423

Filed: February 6, 2014: Examiner: TRAN,HAI V

For: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE

AMENDMENT UNDER RULE 1.114

MAIL STOP AMENDMENT
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

Dear Madam:

In response to the final Office Action dated June 19, 2015, and in conjunction with the concurrently filed request for continued examination (RCE), reconsideration and allowance of the subject application in view of the following amendments and remarks are respectfully requested.
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims

1. (Currently Amended) A method for switching channels carried out by a media play apparatus, the method comprising:
   obtaining channel information about a plurality of channels;
   receiving a channel switching signal; and
   generating channel data according to the channel switching signal by using the obtained channel information,
   wherein the channel information is included in a transport stream of a currently received channel including a program association table (PAT), and
   the PAT includes (i) transport stream identifiers identifying transport streams of the currently received channel and other channels, and (ii) an actual transport stream flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels; and
   the first PSI is distinguished from the second PSI by an actual field.

2. (Previously Presented) The method of claim 1, wherein the obtaining of the channel information about the plurality of channels comprises
   obtaining the channel information by using at least one idling tuner among a plurality of tuners.

3. (Previously Presented) The method of claim 2, wherein the obtaining of the channel information by using at least one idling tuner among the plurality of tuners comprises
   obtaining the channel information of a channel not included in a transport stream under reception.
4. **(Currently Amended)** The method of claim 1, wherein the actual transport stream flag specifies in form of an index at which cell of array the transport stream identifier of the transport stream of the currently received channel is located, the channel information is transported being contained in a program association table (PAT) or a program map table (PMT) including identifiers for a plurality of transport streams.

5. **(Currently Amended)** The method of claim [[4]] 1, wherein channel information of the other channels is included a program map table (PMT) included in the transport stream of the current received channel, the PAT or the PMT further includes an identifier indicating a transport stream in which the PAT or the PMT is included.

6. **(Canceled)**

7. **(Previously Presented)** The method of claim 1, wherein the obtaining channel information of the plurality of channels comprises obtaining channel information by using an internet protocol (IP) network.

8. **(Previously Presented)** The method of claim 1, wherein the obtaining channel information about the plurality of channels comprises receiving channel information from a transport stream received by using a tuner; and receiving channel information of a channel not included in the transport stream from a server by using an internet protocol (IP) network.

9. **(Currently Amended)** An apparatus for switching channels of a media play apparatus, the apparatus for switching channels comprising:

   at least one tuner configured to obtain for obtaining channel information about a plurality of channels; and

   a controller configured to for

   extract extracting the obtained channel information, and

   generate generating channel data according to a received channel switching
signal by using the previously obtained channel information,

wherein the channel information is included in a transport stream of a currently received channel including a program association table (PAT), and

the PAT includes (i) transport stream identifiers identifying transport streams of the currently received channel and other channels, and (ii) an actual transport stream flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers.

wherein the channel information is included in a transport stream of a currently received channel;

the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels, and

the first PSI is distinguished from the second PSI by an actual field.

10. (Original) The apparatus of claim 9, wherein the channel information is obtained by using at least one idling tuner.

11. (Original) The apparatus of claim 10, wherein the idling tuner obtains channel information of a channel not included in a transport stream under reception.

12. (Currently Amended) The apparatus of claim 9, wherein the actual transport stream flag specifies in form of an index at which cell of array the transport stream identifier of the transport stream of the currently received channel is located.

the channel information is transported being contained in a program association table (PAT) or a program map table (PMT) including identifiers of a plurality of transport streams.

13. (Currently Amended) The apparatus of claim 9, wherein channel information of the other channels is included a program map table (PMT) included in the transport stream of the current received channel, the channel information corresponds to a program association table (PAT) or a program map table (PMT) which includes only channel information of a channel contained in another transport stream.
14. (Canceled)

15. (Previously Presented) The apparatus of claim 9, further comprising an internet protocol (IP) transceiver which receives channel information from a server by using an IP network.

16. (Original) The apparatus of claim 15, wherein the IP transceiver receives channel information of a channel from a server, the channel being not included in a transport stream received through the tuner.

17. (Previously Presented) The apparatus of claim 9, further comprising a memory in which obtained channel information is stored, wherein the controller stores the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and performs channel switching according to the channel switching signal by using the channel information stored in the memory.

18-20. (Canceled)
REMARKS

Reconsideration and allowance of the present application in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1, 4-5, 9, and 12-13 have been amended, and claims 6, 14 and 18-20 have been canceled without prejudice or disclaimer of the subject matter embodied in the claims. Support for these amendments can be found at least at paragraphs [87] - [88] as well as Figs. 7 and 8 in the originally filed application. No new matter is, therefore, believed to be introduced by the present amendments. Claims 1-5, 7-13, and 15-17 are pending in this application.

Rejections under 35 U.S.C. § 101

Claim 18-20 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. The rejection is deemed moot due to the cancellation of the claims. Accordingly, Applicant respectfully requests that this rejection be withdrawn

Rejections under 35 U.S.C. § 112

Claims 9-17 are rejected under 35 USC 112, first paragraph. Applicant respectfully believes that the rejection is obviated by the Amendment. If the Office interprets that the Amendment does not obviate this rejection, Applicant nonetheless respectfully requests the Office to communicate Applicant’s representative for further discussion for the Amendment.

Rejections under 35 U.S.C. § 103

Claims 1-20 are rejected under 35 U.S.C. 103 as being unpatentable over Ota et al. (US 2004/0181813) in view of Wang et al. (US 20060062200). The rejection of claims 6, 14, and 18-20 is deemed moot due to the cancellation of the claims. Applicant respectfully traverses this rejection of the remaining claims.

Applicant notes that the present application is directed to switching channels of a media play apparatus, where channel information about a plurality of channels is obtained and the
channel information is included in a transport stream of a currently received channel including a program association table (PAT). In particular, Applicant notes that the PAT presented in the present application includes transport stream identifiers and an actual transport stream flag. In this regard, amended claim 1 recites, inter alia, the features of:

(a) wherein the channel information is included in a transport stream of a currently received channel including a program association table (PAT),” and

(b) “the PAT includes (i) transport stream identifiers identifying transport streams of the currently received channel and other channels, and (ii) an actual transport stream flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers.”

The Office asserted on page 4 of the outstanding Office Action that Ota discloses all the features of claims 1 and 9 of the present application by citing Abstract, Fig. 3 and paragraphs §0023, §0024, §0050, §0056, §0057, and § 0048-0050 of Ota. The Office further asserted on page 4 of the outstanding Office Action that Wang discloses the claimed features of “the first PSI is distinguished from the second PSI by an actual field” by citing “descriptor field in which the multicast IP address is stored” (see paragraphs §0036-0037 and §0039 of page 4 of Wang). However, Applicant respectfully disagrees with the Office’s assertion and interpretation. Even assuming arguendo that the Office’s assertion and interpretation are accurate, Ota and Wang, either alone or in the Office’s combination, fail to disclose or teach the features (a) and (b) of amended claim 1. That is, Ota and Wang fail to disclose the features of “the channel information is included in a transport stream of a currently received channel including a program association table (PAT),” and “the PAT includes (i) transport stream identifiers identifying transport streams of the currently received channel and other channels, and (ii) an actual transport steam flag specifying position of a transport stream identifier of the transport stream of the currently received channel on a transport stream identifier field containing the transport stream identifiers,” as recited in the features (a) – (b) of amended claim 1.

Independent claim 9, as amended, also includes one or more distinct features similar to those of amended claim 1 as set forth above. Amended claims 1 and 9 as well as claims 2-5, 7-8, 10-13, and 15-17 each depending upon amended claim 1 or 9 distinguish from and are patentable over the applied reference of Ota and Wang, either alone or in the Office’s
combination, for at least the related reasons set forth above.

Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

**Conclusion**

All rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance. A swift Notice to that effect is earnestly solicited. If any issues remain, the Examiner is invited to telephone the undersigned Applicants’ attorney of record, to resolve the same.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

HAUPTMAN HAM, LLP

/Yoon S. Ham/
Yoon S. Ham
Registration No. 45,307

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2318 Mill Road, Suite 1400
Alexandria, Virginia 22314
(703) 684-1111
(703) 518-5499 Facsimile
YSH/TL/ha

Date: September 21, 2015
**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

| ENTITY: | LARGE ☑ | SMALL ☐ | MICRO ☐ |

**APPLICATION AS Filed – PART 1**

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**FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))**

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**FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))**

**TOTAL ADD'L FEE**

LIE

/NICOLE NICHOLSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ipfirm.com
pair_lhhb@firsttofile.com
EAustasio@IPFirm.com
Office Action Summary

Application No. 14/174,163
Applicant(s) KIM, TAE GAP
Examiner HAI V. TRAN
Art Unit 2423
AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication. Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☑️ Responsive to communication(s) filed on 04/07/2015.
   □ A declaration(s)/affidavit(s) under 37 CFR 1.130(b) was/were filed on _____.
2a) ☑️ This action is FINAL. 2b) □ This action is non-final.
3) □ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
4) □ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☐ Claim(s) 1-20 is/are pending in the application.
   5a) Of the above claim(s) _____ is/are withdrawn from consideration.
6) □ Claim(s) _____ is/are allowed.
7) ☑️ Claim(s) 1-20 is/are rejected.
8) □ Claim(s) _____ is/are objected to.
9) □ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the Patent Prosecution Highway program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10) □ The specification is objected to by the Examiner.
11) □ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) □ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12) □ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:
   a) ☐ All   b) ☐ Some**  c) ☐ None of the:
   1. ☑️ Certified copies of the priority documents have been received.
   2. □ Certified copies of the priority documents have been received in Application No. _____.
   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑️ Notice of References Cited (PTO-892)
2) ☑️ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
   Paper No(s)/Mail Date _____
3) □ Interview Summary (PTO-413)
   Paper No(s)/Mail Date: _____.
4) □ Other: _____.
The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

**DETAILED ACTION**

*Response to Arguments*

Applicant's arguments with respect to amended claims 1-20 (04/07/2015) have been considered but are moot in view of a new ground rejection.

**Claim Rejections - 35 USC § 101**

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims do not fall within at least one of the four categories of patent eligible subject matter because based upon an analysis with respect to the claim as a whole, claims 18-20 claim "a media data transport packet" which is a form of "signal" per se is not considered patentable subject matter under §101 and is non-statutory for that reason.

**Claim Rejections - 35 USC § 112**

Claims 9-17 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, because the specification, while being enabling for Fig. 1-3 and Applicant’s specification pages 7-16, does not reasonably provide enablement for “at least one
tuner configured to obtain channel information about a plurality of channels” and “a
controller configured to extract the obtained channel information, generate channel
data…”

The specification does not enable any person skilled in the art to which it
pertains, or with which it is most nearly connected, to make and use the invention
commensurate in scope with these claims. The claim is not fully enabled, or that it lacks
sufficient written description support in the specification because the claimed limitations
“at least one tuner configured to…” and “a controller configured to ....”, respectively, is
exceedingly broad in scope in which the term “configured to” would apparently cover
any and every conceivable configurations for performing/achieving the recited functions
while Applicant’s specification discloses at most only those known to the
Applicant/Inventor. For that reason, its breadth is likely not commensurate in scope with
the scope of the structures disclosed in the specification for performing such functions,
see MPEP § 2164.08 Enablement Commensurate in Scope With the Claims [R-
2005).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all
obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed
invention is not identically disclosed as set forth in section 102 of this title, if the differences
between the claimed invention and the prior art are such that the claimed invention as a whole
would have been obvious before the effective filing date of the claimed invention to a person
having ordinary skill in the art to which the claimed invention pertains. Patentability shall not
be negated by the manner in which the invention was made.

1. Claims 1-20 are rejected under 35 U.S.C. 103 as being unpatentable over Ota et al. (US 2004/0181813) in view of Wang et al. (US 20060062200).

Claim 1, Ota discloses a method for switching channels carried out by a media play apparatus (Abstract), the method comprising:

- obtaining channel information about a plurality of channels (see Fig. 3A el. 310; see §0023; §0050; §0056);
- receiving a channel switching signal (§0024; §0057); and
- generating channel data according to the channel switching signal by using the obtained channel information (§0057),

wherein the channel information is included in a transport stream of a currently received channel (§0048), the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels (§0049-0050).

Ota does not disclose “the first PSI is distinguished from the second PSI by an actual field”.

Wang discloses the first PSI is distinguished from the second PSI by an actual field (descriptor field in which the multicast IP address is stored – see page 4 §0036-0037; and §0039).
Therefore, it would have been obvious to one of ordinary skill in the art at
the time the invention was made to modify Ota’s PSI to a new PSI carries IP
address for distinguishing between PSIs, as taught by Wang, in order to yield
predictable results such as to provide an apparatus is able to receive video TS
from both IP network and CATV network, as desired.

Claim 2, the method of claim 1, Ota (§0057) in view of Wang further
discloses wherein the obtaining of the channel information about the plurality of
channels comprises obtaining the channel information by using at least one idling
tuner among a plurality of tuners.

Claim 3, the method of claim 2, Ota (§0063-0064;0067-0068) in view of
Wang further discloses wherein the obtaining of the channel information by using
at least one idling tuner among the plurality of tuners comprises obtaining the
channel information of a channel not included in a transport stream under
reception.

Claim 4, the method of claim 1, Ota (reads on “program table information”
of each TS – see §0047-0049; §0056-0057) in view of Wang (§0031) further
discloses wherein the channel information is transported being contained in a
program association table (PAT) or a program map table (PMT) including
identifiers for a plurality of transport streams.
Claim 5, the method of claim 4, Ota (§0047-0048) in view of Wang (§0031) further discloses wherein the PAT or the PMT further includes an identifier indicating a transport stream in which the PAT or the PMT is included.

Claim 6, the method of claim 1, Ota (§0047-0048) in view of Wang (§0031) further discloses wherein the channel information is transported being contained in a program association table (PAT) or a program map table (PMT) of a transport stream, and the channel information further includes channel information of a channel contained in another transport stream.

Claim 7, the method of claim 1, Ota in view of Wang (see page 2 §0014-0018) further discloses wherein the obtaining channel information of the plurality of channels comprises obtaining channel information by using an internet protocol (IP) network.

Claim 8, the method of claim 1, Ota in view of Wang (see page 2 §0014-0018) further discloses wherein the obtaining channel information about the plurality of channels comprises receiving channel information from a transport stream received by using a tuner; and receiving channel information of a channel
not included in the transport stream from a server by using an internet protocol (IP) network.

Claim 9, an apparatus for switching channels of a media play apparatus, the apparatus is analyzed with respect to Claim 1 in which Ota (Fig. 2B, 3B-C and 5B) in view of Wang further discloses at least one tuner and a controller.

Claim 10, the apparatus of claim 9, Ota in view of Wang is analyzed with respect to Claim 2.

Claim 11, the apparatus of claim 10, is analyzed with respect to Claim 3.
Claim 12, the apparatus of claim 9, is analyzed with respect to Claim 4.
Claim 13, the apparatus of claim 9, is analyzed with respect to Claim 6.
Claim 14, the apparatus of claim 9, is analyzed with respect to Claims 5 and 6.

Claim 15, the apparatus of claim 9, is analyzed with respect to Claim 7.
Claim 16, the apparatus of claim 15, is analyzed with respect to Claim 8.
Claim 17, the apparatus of claim 9, Ota in view of Wang further discloses comprising a memory (Ota F2B el. 202) in which obtained channel information is stored, wherein the controller stores the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and performs channel switching according to the channel switching signal by using the channel information stored in the memory (page 5 §0056-0058).
Claim 18, a media data transport packet is analyzed with respect to Claim 1.

Claim 19, the media data transport packet of claim 18, is analyzed with respect to Claim 4.

Claim 20, the media data transport packet of claim 18, Ota (page 7 §0092-0093) in view of Wang further discloses wherein a plurality of program association tables (PATs) or program map tables (PMTs) are included, and the PATs or the PMTs each includes the transport stream identifier for the plurality of media data.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAI V. TRAN whose telephone number is (571)272-7305. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, BENJAMIN BRUCKART can be reached on (571)272-3982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HAI V. TRAN/
Primary Examiner, Art Unit 2423
# Notice of References Cited

## U.S. Patent Documents

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## Non-Patent Documents

*Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages*

| * | Document Number       | Date | Country | Name | Classification |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.*
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|                    | 1       | European Search Report mailed October 22, 2014 for 14155640.7, citing the above reference(s). | |

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**EXAMINER SIGNATURE**

| Examiner Signature | /HAI TRAN/ | Date Considered | 06/15/2015 |

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature: /Yoon S. Ham/
Name/Print: Yoon S. Ham
Date (YYYY-MM-DD): 2015-01-02
Registration Number: 45,307

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :

Tae Gap KIM : Confirmation No.: 6315

U.S. Patent Application No. 14/174,163 : Group Art Unit: 2425

Filed: February 6, 2014 : Examiner: PENDLETON, BRIAN T

For: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Dear Sir/Madam:

In response to the Office Action dated January 7, 2015, reconsideration and allowance of the subject application in view of the following amendments and remarks are respectfully requested.
Amendments to the Claims:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

Listing of the Claims

1. (Currently Amended) [[In a]] A method for switching channels carried out by a media play apparatus, the method comprising:
   obtaining channel information about a plurality of channels;
   receiving a channel switching signal; and
   generating channel data according to the channel switching signal by using the obtained channel information,
   wherein the channel information is included in a transport stream of a currently received channel,
   the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels, and
   the first PSI is distinguished from the second PSI by an actual field.

2. (Currently Amended) The method of claim 1, wherein the obtaining of the channel information about [[a]] the plurality of channels comprises
   obtaining the channel information by using at least one idling tuner among a plurality of tuners.

3. (Currently Amended) The method of claim 2, wherein the obtaining of the channel information by using at least one idling tuner among [[a]] the plurality of tuners comprises
   obtaining the channel information of a channel not included in a transport stream under reception.

4. (Currently Amended) The method of claim 1, wherein the channel information is transported being contained in a program association table (PAT) or a program map table (PMT)
including identifiers for a plurality of transport streams.

5. (Currently Amended) The method of claim [[1]] 4, wherein [[The]] the PAT or the PMT further includes an identifier indicating a transport stream in which the PAT or the PMT is included.

6. (Currently Amended) The method of claim 1, wherein the channel information is transported being contained in a program association table (PAT) or a program map table (PMT) a PAT or a PMT of a transport stream, and the channel information further includes channel information of a channel contained in another transport stream.

7. (Currently Amended) The method of claim 1, wherein the obtaining channel information of [[a]] the plurality of channels comprises obtaining channel information by using an internet protocol (IP) network.

8. (Currently Amended) The method of claim 1, wherein the obtaining channel information about [[a]] the plurality of channels comprises receiving channel information from a transport stream received by using a tuner; and receiving channel information of a channel not included in the transport stream from a server by using an internet protocol (IP) network.

9. (Currently Amended) [[In an]] An apparatus for switching channels of a media play apparatus, an apparatus, the apparatus for switching channels comprising:

at least one tuner configured to obtain channel obtaining information about a plurality of channels; and

a controller configured to

extract the obtained extracting channel information, from the channel data and
generate generating channel data according to a received channel switching signal by using the previously obtained channel information,

wherein the channel information is included in a transport stream of a currently received
channel,
the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels, and

the first PSI is distinguished from the second PSI by an actual field.

10. (Original) The apparatus of claim 9, wherein the channel information is obtained by using at least one idling tuner.

11. (Original) The apparatus of claim 10, wherein the idling tuner obtains channel information of a channel not included in a transport stream under reception.

12. (Currently Amended) The apparatus of claim 9, wherein the channel information is transported being contained in a program association table (PAT) or a program map table (PMT) a PAT or PMT including identifiers of a plurality of transport streams.

13. (Currently Amended) The apparatus of claim 9, wherein the channel information corresponds to a program association table (PAT) or a program map table (PMT) a PAT or PMT which includes only channel information of a channel contained in another transport stream.

14. (Currently Amended) The apparatus of claim 9, wherein the channel information is in a program association table (PAT) or a program map table (PMT) a PAT or PMT which further includes channel information of a channel included in another transport stream, and the PAT or the PMT further includes an identifier indicating a transport stream in which the PAT or the PMT is included.

15. (Currently Amended) The apparatus of claim 9, further comprising an internet protocol (IP) transceiver which receives channel information from a server by using an IP network.
16. (Original) The apparatus of claim 15, wherein the IP transceiver receives channel information of a channel from a server, the channel being not included in a transport stream received through the tuner.

17. (Currently Amended) The apparatus of claim 9, further comprising a memory in which obtained channel information is stored, [[and]] wherein the controller stores the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and performs channel switching according to the channel switching signal by using the channel information stored in the memory.

18. (Currently Amended) In a media data transport packet, a media data transport packet, comprising transport stream identifiers for a plurality of media data, wherein the media data transport packet is used by an apparatus for switching channels of a media play apparatus, the apparatus for switching channels is configured to obtain channel information and generate channel data according to a received channel switching signal by using the previously obtained channel information, the channel information is included in a transport stream of a currently received channel, the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels, and the first PSI is distinguished from the second PSI by an actual field.

19. (Currently Amended) The media data transport packet of claim 18, wherein a program association table (PAT) or a program map table (PMT) a PAT or PMT is included, and the PAT or the PMT includes the transport stream identifiers for [[a]] the plurality of media data.
20. (Currently Amended) The media data transport packet of claim 18, wherein a plurality of program association tables (PATs) or program map tables (PMTs) are included, and the PATs or the PMTs each includes the transport stream identifier for [[a]] the plurality of media data.
REMARKS

Reconsideration and allowance of the present application in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1-9, 12-15 and 17-20 have been amended. Support for these amendments can be found at least at paragraphs [82] ~ [84] in the originally filed application. No new matter is, therefore, believed to be introduced by the present amendments. Claims 1-20 are pending in this application.

Rejections under 35 U.S.C. § 102

Claims 1-7 and 17-20 are rejected under pre-AIA 35 U.S.C. § 102(a)(1) as being anticipated by US20110096829 A1 ("Sakaguchi"). Applicant respectfully traverses this rejection.

Amended claim 1 recites, inter alia, the features of:

(i) "the channel information is included in a transport stream of a currently received channel,

the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels;"

(ii) "the first PSI is distinguished from the second PSI by an actual field;” and

(iii) "wherein the precise unit includes at least one of a slice unit and a partition unit."

The Office asserted on pages 2-3 of the outstanding Office Action that Sakaguchi discloses all the features of claims 1 and 9 of the present application by citing Figs. 2-4 and 11-15, paragraphs [0106]-[0126], [0170-0183] of Sakaguchi. However, Applicant respectfully disagree with the Office’s assertion and interpretation. Sakaguchi merely describes that “a broadcasting station transmits an MPEG2-TS having at least one set of audio data, video data, and data associated with a television program. As shown in FIG. 2, an MPEG2-TS includes data of a channel, such as video data, audio data, and TS control data. The TS data includes a Program Association Table (PAT), a Program Map Table, and an Event Information Table.”
Even assuming arguendo that the Office’s assertion and interpretation are accurate, Sakaguchi is still silent as to the features (i) - (iii) of amended claim 1. That is, Sakaguchi fails to disclose the features of “the channel information is included in a transport stream of a currently received channel, the transport stream of the currently received channel includes a first program specific information (PSI) corresponding to the currently received channel and a second PSI corresponding to the other channels,” and “the first PSI is distinguished from the second PSI by an actual field,” as recited in the features (i) – (iii) of amended claim 1.

Claims 9 and 18 also include one or more distinct features similar to those of amended claim 1 as set forth above. Amended claims 1, 9 and 18 as well as claims 6-7, 17 and 19-20 each depending upon amended claim 1, 9 or 18 distinguish from and are patentable over the applied reference of Sakaguchi for at least the related reasons set forth above.

Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(a)(1) are respectfully requested.

**Rejections under 35 U.S.C. § 103**

Claims 8 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable by Sakaguchi as applied to claim 1 above, and further in view of US20090019479 (“Kwak”). Applicant respectfully traverses this rejection.

The applied reference of Kwak fails to cure the deficiencies of Sakaguchi for at least the reasons set forth above with respect to amended claim 1 or 9. Claims 8 and 17 each depending upon claim 1 or 9 is also patentable over the applied reference of Sakaguchi and Kwak, either alone or in the Office’s combination, for at least the related reasons set forth above.

Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

**Conclusion**

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited. Early issuance of a Notice of Allowance is courteously solicited.
The Examiner is invited to telephone the undersigned, Applicant’s attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

LOWE HAUPTMAN & HAM, LLP

By: /Yoon S. Ham/
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Registration No. 45,307

Customer Number: 22429
2318 Mill Road, Suite 1400
Alexandria, Virginia 22314
(703) 684-1111
(703) 518-5499 Facsimile
Date: April 07, 2015
YSH/TL/ab
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### Warnings:

### Information:
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ipfirm.com
pair_lhhb@firsttofile.com
EAnastasio@IPFirm.com
Office Action Summary

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF
THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☑ Responsive to communication(s) filed on 2/6/14.
   □ A declaration(s)/affidavit(s) under 37 CFR 1.130(b) was/were filed on ______.

2a) □ This action is FINAL. 2b) ☑ This action is non-final.

3) □ An election was made by the applicant in response to a restriction requirement set forth during the interview on ______; the restriction requirement and election have been incorporated into this action.

4) □ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.
   5a) Of the above claim(s) ______ is/are withdrawn from consideration.

6) □ Claim(s) ______ is/are allowed.

7) ☑ Claim(s) 1-20 is/are rejected.

8) □ Claim(s) ______ is/are objected to.

9) □ Claim(s) ______ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the Patent Prosecution Highway program at a
participating intellectual property office for the corresponding application. For more information, please see
http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10) □ The specification is objected to by the Examiner.

11) □ The drawing(s) filed on ______ is/are: a) ☑ accepted or b) □ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12) □ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) □ All  b) ☑ Some**  c) □ None of the:
   1. □ Certified copies of the priority documents have been received.
   2. □ Certified copies of the priority documents have been received in Application No. ______.
   3. □ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) □ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)

   Paper No(s)/Mail Date ______.

3) □ Interview Summary (PTO-413)

   Paper No(s)/Mail Date ______.

4) □ Other: ______.
The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

**Claim Objections**

**Claim Rejections - 35 USC § 102**

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

**Claims 1-7 and 17-20 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by US Pub. 2011/0083148 (“Sakaguchi”).**

As to claims 1 and 9, Sakaguchi teaches a system and method for receiving and storing information about a plurality of channels and then utilizing the stored channel information to retrieve channel information in response to a user’s channel selection operation. Sakaguchi at Fig. 2-4 and 11-15. Sakaguch further teaches the steps of [1] obtaining information about a plurality of channels (see id. at [0106-126]), [2]
receiving a channel switching signal (see id. at [0170-177]), and [3] generating channel data according to the channel switching signal by using the obtained channel information (see id. at [0177-183]).

As to claims 2 and 10, Sakaguchi further teaches that obtaining information about a plurality of channels comprises obtaining channel information by using at least one idling tuner among a plurality of tuners. Id. at Fig. 23 and [0327-330].

As to claims 3 and 11, since the system of Sakaguchi is directed towards obtaining information about channels that the user is not currently viewing and may wish to tune into, the system of Sakaguchia, supra, necessarily discloses that obtaining channel information by using at least one idling tuner among a plurality of tuners comprises obtaining channel information of a channel not included in a transport stream under reception.

As to claims 4 and 12, Fig. 2-4 of Sakaguchi teach that the channel information is transported being contained in a program association table (PAT) or program map table (PMT) including identifiers for a plurality of transport streams.

As to claims 5 and 14, Fig. 4 of Sakaguchi discloses that the PAT or PMT further includes an identifier indicating a transport stream in which the PAT or PMT is included.

As to claim 6, Sakaguchi teaches that the system receives PAT/PMT data for all available channels, in accordance with the limitation that the channel information is transported being contained in a PAT or PMT of a transport stream, and the
channel information further includes channel information of a channel contained in another transport stream. Id. at Fig. 2-4 and [0106-126].

As to claims 7 and 16, Sakaguich further teaches that the channel data and programming “may be distributed via a communication network, such as the Internet,” in accordance with the limitation that obtaining information of a plurality of channels comprises obtaining channel information by using an IP network. Id. at [0043].

As to claims 18, Sakaguchi explicitly teaches a media data transport packet, comprising transport stream identifiers for a plurality of media data. Id. at Fig. 2-4 and [0106-126].

As to claims 19 and 20, Fig. 4 of Sakaguchi further teaches that the PAT or PMT includes the transport stream identifiers for a plurality of media data (claim 19) and a plurality of PATs or PMTs are included, and the PAT or PMT each includes the transport stream identifier for a plurality of media data (claim 20). Id. at Fig. 2-4 and [0106-126].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.
Claims 8 and 17 are rejected under 35 U.S.C. 103 as being unpatentable over Sakaguchi as applied to claim 1 above, and further in view of US Pub. 20090019479 ("Kwak").

As to claim 8, Sakaguchi, supra. teaches that the system can receive both PMT/PAT and video programming over the Internet and further teaches obtaining information about a plurality of channels comprises [1] receiving channel information from a transport stream received by using a tuner, but does not explicitly teach [2] receiving channel information of a channel not included in the transport stream from a server by using an IP network. In an analogous art, Fig. 1 and 5 of Kwak teaches a system for receiving and storing channel information from a plurality of sources including terrestrial wave, cable, and satellite broadcast as well as the Internet. Id. at [0008-19] and [0060-67].

It would have been obvious to one of ordinary skill in the art at the time the application was effectively filed to modify the system of Sakaguchi to incorporate the multiple tuners and content sources taught by Kwak. This would have been desirable as it would have allowed the users of Sakaguchi’s system to have access to a greater range of programming. One of ordinary skill in the art at the time of the effective filing date would have recognized this as a combination of known elements that would have yielded predictable results.

As to claim 17, Sakaguchi teaches that the system receives and stores the channel information in the recited memory in which obtained channel information is stored. Id. at [0106-126]. However, Sakaguchi does not explicitly teach that the
controller stores the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and performs channel switching according to the channel switching signal by using the channel information stored in the memory. In an analogous art, Fig. 1 and 5 of Kwak teaches a system for receiving and storing channel information from a plurality of sources including terrestrial wave, cable, and satellite broadcast as well as the Internet. *Id.* at [0008-19] and [0060-67]. Fig. 4 of Kwak further teaches that the system compares the received channel information to the stored channel information and stores the updated channel information. *Id.* at [0054-59].

It would have been obvious to one of ordinary skill in the art at the time the application was effectively filed to modify the system of Sakaguchi to incorporate the channel information comparison taught by Kwak. This would have been desirable as it would have ensured that Sakaguchi’s system provided users with the most current channel information. One of ordinary skill in the art at the time of the effective filing date would have recognized this as a combination of known elements that would have yielded predictable results.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN STRONCZER whose telephone number is (571)270-3756. The examiner can normally be reached on 7:30 AM - 5:00 PM (EDT), Monday-Friday.
If attempts to reach the examiner by telephone are unsuccessful, the examiner’s 
supervisor, Brian T. Pendleton can be reached on (571) 272-7527. The fax phone 
number for the organization where this application or proceeding is assigned is 571- 
273-8300.

Information regarding the status of an application may be obtained from the 
Patent Application Information Retrieval (PAIR) system. Status information for 
published applications may be obtained from either Private PAIR or Public PAIR. 
Status information for unpublished applications is available through Private PAIR only. 
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should 
you have questions on access to the Private PAIR system, contact the Electronic 
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USPTO Customer Service Representative or access to the automated information 
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ryan Stronczek/ 
Examiner, Art Unit 2425

/Fernando Alcon/ 
Primary Examiner, Art Unit 2425
Notice of References Cited

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* A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
* Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Non-Patent Documents

Include as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages

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**EXAMINER SIGNATURE**

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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. 2 Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). 3 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 4 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 5 Applicant is to place a check mark here if English language translation is attached.
CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature /Yoon S. Ham/ Date (YYYY-MM-DD) 2015-01-02
Name/Print Yoon S. Ham Registration Number 45,307

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### Electronic Acknowledgement Receipt

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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.
Title: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

Publication Date: 11/13/2014

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101
This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

Application Number: 10-2013-0051739
Filing Date: MAY 08, 2013
Applicant(s): Humax Co., Ltd.
【서지사항】

【서류명】 특허출원서
【참조번호】 0954
【출원구분】 특허출원
【출원인】
【영칭】 (주)휴맥스
【출원인코드】 1-2009-054963-1

【대리인】
【영칭】 에스앤아이피특허법인
【대리인코드】 9-2013-100001-8
【지정관리인】 김상용
【포괄위임등록번호】 2013-007097-3

【발명의 국문명칭】 선회득한 PSI를 사용하는 채널 변경 방법 및 장치
【발명의 영문명칭】 METHODS AND APPARATUSES OF CHANNEL SWITCHING USING PRE-ACQUISITIED PSI TABLE

【발명자】
【성명】 김태길
【성명의 영문표기】 KIM Tae Gap
【주민등록번호】 730105-1XXXXXX
【우편번호】 463-440
【주소】 경기도 성남시 분당구 운중동 982-3 201호
【국적】 KR

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 에스앤아이피특허법인 (서명 또는 인)

38-1
제출 일자 : 2013-05-08

[수수료]

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38-2
[명세서]

[발명의 명칭]
신축적한 PSI를 사용하는 채널 변경 방법 및 장치(METHODS AND APPARATUSES OF CHANNEL SWITCHING USING PRE-AQUISITIED PSI TABLE)

[기술분야]

<1> 방송 수신 방법에 관한 것으로서, 더욱 성대하게는 방송 채널의 변경 방법에 관한 것이다.

[배경기술]

<2> 방송망을 통한 TV 서비스와 함께 인터넷을 이용하여 양방향 TV 서비스를 제공하는 아이티비아( IPTV) 서비스가 제공되고 있다. IPTV는 IP 비디오 신호를 처리하여 끝은 TV 신호로 변환해 주는 셸블록스에 접속되며, SVS (switched video service) 시스템을 이용하면 시청자의 기호에 따라 광대역 네트워크 채널이나 가입자 서비스 및 영화 감상 등의 서비스에 선택적으로 접속할 수 있다.

<3> IPTV는 기존의 지상파 방송과 같은 아날로그 방송이 제공할 수 없는 양방향성을 비롯하여, 고화질의 영상제공, 다양한 부가서비스 제공 등의 측면에서 장점을 가진다.

<4> 그럼에도 불구하고, 종래의 IP-TV는 특정 채널을 시청중인 사용자가 다른 채널로 채널을 변경하고자 하는 경우에 아날로그 방송에 비해 채널변경이 이루어지기까지 더 긴 시간 지연(제명 건련)이 발생한다. IPTV의 채널 변경시 발생하는
체널 제명 타임(channel zapping time)은 IP-TV의 전송 및 수신방식에 기인한다. 따라서, 이러한 IPTV와 같은 방송 시스템에 있어서, 제널 제명 타임을 줄이는 방법이 요구된다.

[발명의 내용]

[해결하려는 과제]

<5> 상기한 문제를 해결하기 위한 본 발명의 목적은 제널 변경 시 소요되는 제널 제명 타임을 줄이는 제널 변경 방법 및 장치를 제공하는 것이다.

[관제의 해결 수단]

<6> 상기한 문제를 해결하기 위한 본 발명의 일 실시 예들에 따른 제널 변경 방법은 미디어 제료 장치에 의해 수행되는 제널 변경 방법에 있어서, 트너를 사용하여 복수의 제널 정보를 취득하는 단계; 제널 변경 신호를 수신하는 단계; 및 상기 취득한 제널정보를 사용하여 상기 제널 변경 신호에 따른 제널의 데이터를 생성하는 단계를 포함한다.

<7> 상기 제널정보는 상기 복수 제널의 PSI(PROGRAM SPECIFIC INFORMATION)에 포함된 PID일 수 있다.

<8> 상기 제널의 데이터를 생성하는 단계는 상기 PID를 사용하여 상기 제널의 오디오 및 비디오 데이터 중 적어도 하나를 생성하는 단계일 수 있다.

<9> 상기 제널 정보는 복수 전송 스트림(Transport Stream)의 식별자를 포함하는 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송될
수 있다.

상기 채널 정보는 전송 스트림(Transport Stream)의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송되며, 상기 채널 정보는 상기 전송 스트림의 채널정보를 제외하고 다른 복수의 전송 스트림(Transport Stream)의 채널 정보를 포함할 수 있다.

상기 PAT 또는 PMT는 자신이 포함된 전송 스트림을 나타내는 식별자를 더 포함할 수 있다.

상기 복수의 채널 정보를 취득하는 단계는, 가용 튜너 및 테이터 수신을 하지 않고 있는 튜너 중 어느 하나를 사용하여 상기 채널들의 채널 정보를 취득하는 단계를 포함할 수 있다.

상기 복수 채널의 채널 정보를 취득하는 단계는, 특정 채널의 데이터 수신 중에 다른 채널의 채널정보를 취득하는 단계를 포함할 수 있다.

또한, 상기한 문제를 해결하기 위한 본 발명의 일 실시 예들에 따른 채널 변경 장치는 미디어 재생 장치의 채널 변경 장치에 있어서, 복수의 채널 데이터를 취득하는 적어도 하나의 튜너 및 상기 채널 데이터에서 채널 정보를 추출하고, 수신되는 채널 변경 신호에 따라 상기 선취적한 채널정보를 사용하여 채널의 데이터를 생성하는 제어부를 포함한다.

상기 채널정보는 상기 복수 채널의 PSI(PROGRAM SPECIFIC INFORMATION)에 포함된 PID일 수 있다.
상기 제어부는 상기 PID를 사용하여 상기 채널의 오디오 및 비디오 데이터 중 적어도 하나를 생성할 수 있다.

상기 채널 정보는 복수 전송 스트림(Transport Stream)의 식별자를 포함하는 PAT(Program Association Table) 또는 PMT(Program Map Table)에 포함되어 전송될 수 있다.

상기 채널 정보는 전송 스트림(Transport Stream)의 PAT(Program Association Table) 또는 PMT(Program Map Table)에 포함되어 전송되며, 상기 채널 정보는 상기 전송 스트림의 채널정보를 제외하고 다른 복수의 전송 스트림(Transport Stream)의 채널 정보를 포함할 수 있다.

상기 PAT 또는 PMT는 자신이 포함된 전송 스트림을 나타내는 식별자를 더 포함할 수 있다.

상기 제어부는 상기 튜너부의 적어도 하나의 튜너들 중에서 가중 튜너 및 데이터 수신을 하지 않고 있는 튜너 중 어느 하나를 사용하여 상기 채널들의 채널 정보를 취득할 수 있다.

상기 제어부는 특정 채널의 데이터 수신 중에 다른 채널의 채널정보를 취득할 수 있다.

상기 제어부는 취득한 채널 정보를 메모리에 저장하고, 상기 채널 변경 신호에 따라 상기 메모리에 저장된 상기 채널 정보를 사용하여 채널 변경을 수행할 수 있다.
또한, 상기한 문제를 해결하기 위한 본 발명의 일 실시 예들에 따른 미디어 데이터 전송 패킷은 미디어 데이터 전송 패킷에 있어서, 복수의 미디어 데이터 전송 스트림의 식별자와 포함한다.

상기 미디어 데이터 전송 패킷은 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)를 포함하고, 상기 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)는 상기 복수의 미디어 데이터 전송 스트립 식별자를 포함할 수 있다.

상기 미디어 데이터 전송 패킷은 복수의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)를 포함하고, 상기 각각의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)는 상기 복수의 미디어 데이터 전송 스트립 식별자를 각각 포함할 수 있다.

【발명의 효과】

전술한 본 발명의 일 실시예들에 따른 채널 변경 방법 및 장치는 PSI 또는 PID와 같은 채널 정보를 채널 변경이 발생하기 전에 미리 저장하여 두고, 채널 변경이 발생할 때 저장하여 둔 채널 정보를 사용하여 변경된 채널의 오디오 및 비디오 데이터를 생성함으로써, 채널 변경시 변경될 채널의 PSI 또는 PID와 같은 채널 정보를 산출하는 과정을 생략하게 하여 채널 변경 타임을 줄이는 효과를 가진다.

【도면의 간단한 설명】

도 1은 TS의 생성 및 전송을 개념적으로 나타낸 도면이다.
도 2는 주파수 대역에 따른 채널을 도시하는 도면이다.

도 3은 본 발명의 일 실시 예에 따른 채널 변경 장치의 블록도이다.

도 4는 본 발명의 일 실시 예에 따른 채널 변경 방법의 순서도이다.

도 5는 종래의 PAT 구성이다.

도 6은 종래의 PMT 구성이다.

도 7은 본 발명의 일 실시 예에 따른 transport_stram_id의 구성이다.

도 8은 본 발명의 다른 실시 예에 따른 PAT 구성이다.

도 9는 본 발명의 일 실시 예에 따른 PMT 구성이다.

【발명을 실시하기 위한 구체적인 내용】

<28> 본 발명은 다양한 변경을 가할 수 있고 여러 가지 실시예를 가질 수 있는 바, 특정 실시예들을 도면에 예시하고 상세하게 설명하고자 한다.

<29> 그러나, 이는 본 발명을 특정한 실시 형태에 대해 한정하려는 것이 아니며, 본 발명의 사상 및 기술 범위에 포함되는 모든 변경, 근본들 내지 대체들을 포함하는 것으로 이해되어야 한다.

<30> 제1, 제2 등의 용어는 다양한 구성요소들을 설명하는데 사용될 수 있지만, 상기 구성요소들은 상기 용어들에 의해 한정되어서는 안 된다. 상기 용어들은 하나의 구성요소를 다른 구성요소로부터 구별하는 목적으로만 사용된다. 예를 들어, 본 발명의 권리 범위에 벗어나지 않으면서 제1 구성요소는 제2 구성요소로 명명될 수 있고, 유사하게 제2 구성요소도 제1 구성요소로 명명될 수 있다. 및/또는 이라는
용어는 복수의 관련된 기체된 항목들의 포함 또는 복수의 관련된 기체된 항목들 중의 어느 항목을 포함한다.

31. 어떤 구성요소가 다른 구성요소에 "연결되어" 있다거나 "접속되어" 있다고 언급된 때에는, 그 다른 구성요소에 직접적으로 연결되어 있거나 또는 접속되어 있을 수도 있지만, 중간에 다른 구성요소가 존재할 수도 있다고 이해되어야 할 것이 다. 반면에, 어떤 구성요소가 다른 구성요소에 "직접 연결되어" 있다거나 "직접 접속되어" 있다고 언급된 때에는, 중간에 다른 구성요소가 존재하지 않는 것으로 이해되어야 할 것이다.

32. 본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다. 단수의 표현은 문맥상 명백하게 다르게 뜻하지 않는 한, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가지다" 등의 용어는 명세서상에 기재된 특징, 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이지, 하나 또는 그 이상의 다른 특징들이나 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것들의 존재 또는 부가 가능성을 미리 배제하지 않는 것으로 이해되어야 한다.

33. 다르게 정의되지 않는 한, 기술적이거나 과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미를 가지고 있다. 일반적으로 사용되는 사전에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥 상 가지는 의미와 일치하는 의미를 가진 것으로 해석되어야 하며, 본 출원에서 명백하게 정의하지 않는
한, 이상적이거나 과도하게 형식적인 의미로 해석되지 않는다는.

이하, 전부한 도면들을 참조하여, 본 발명의 바람직한 실시예를 보다 상세하게 설명하고자 한다. 본 발명을 설명함에 있어 전체적인 이해를 유기하게 하기 위하여 도면상의 동일한 구성요소에 대해서는 동일한 참조부호를 사용하고 동일한 구성요소에 대해서 중복된 설명을 생략한다.

도 1은 TS(Transport Stream)의 생성 및 전송을 개념적으로 나타내고 면 도면이다. 도 1은 TS 생성기(100), TS 전송기(200) 및 TS 수신기(300)를 도시한다. TS 생성기(100)에서 영화, 뉴스, 스포츠 프로그램 및 데이터 테이블은 멀티플렉서를 사용하여 TS(Transport Stream)으로 집합되어 생성되고 TS 전송기(200)로 전달된다. TS 생성기(100)에서 생성된 TS는 영화(movie), 뉴스(news cast), 스포츠 프로그램(sport program) 및 데이터 테이블(data table)을 포함한다. 영화, 뉴스 및 스포츠 프로그램은 오디오, 비디오 및 데이터를 포함하며 후속 TS 수신기(300)에서 재생할 수 있다. 예를들면, 영화는 오디오, 비디오 및 데이터가 멀티플렉서(100a)에서 멀티플렉스되어 영화 프로그램을 수용하는 데이터 개체로 생성된다. 마찬가지 방식으로, 뉴스캐스트, 스포츠 프로그램도 멀티플렉서(100b, 100c)에서 각각 멀티플렉스된다.

데이터 테이블은 PMT(Program Map Table), EPG(Electronic Program Guide) 및 기타 정보를 포함하며 TS 전송기(200)에서의 TS의 전송과 TS 수신기(300)에서의 TS의 수신 및 사용에 관련된 정보를 포함한다. 데이터 테이블은 PMT, EPG 등이 멀티
플렉시(100d)에서 멀티플렉서가 테이터 테이블을 수용하는 테이터 계체로 생성된다.

그리고, 각각의 멀티플렉서(100a, 100b, 100c, 100d)에서 멀티플렉서가 생성된 각각의 테이터 계체는 멀티플렉서(100c)에서 한번 더 멀티플렉스 되어 TS로 생성된다.

TS 전송기(200)는 TS 생성기(100)에서 생성된 TS를 전달받아 유션 또는 무선 통신 방법으로 TS 수신기(300)로 전송한다. 예를 들면, TS 전송기(200)는 위성, 지상파, 케이블 또는 기타 전송 수단을 사용하여 TS를 전송한다. TS 전송기(200)는 상이한 TS 마다 상이한 주파수 대역을 접유하도록 각 주파수대역에 저장된 TS를 전송한다.

TS 수신기(300)는 TS에 포함된 테이터 테이블을 사용하여 TS의 수신에 필요한 정보를 얻을 수 있다. 예를 들면, TS에는 영상, 뉴스, TV, 라디오, 데이터 채널과 같은 다수의 서비스들이 포함되어 있다. TS에 위와 같은 서비스들이 포함되어 있음을 표현하기 위하여 TS는 데이터 테이블에 PAT(Program Association Table), PMT(Program Map Table), SDT(Service Description Table)와 같은 정보를 포함할 수 있다.

도 2는 주파수 대역에 따른 채널(서비스)을 예시적으로 도시하는 도면으로서, 방송위성인 아스트라(Astra) 19.2 위성의 주파수 대역(Freq)과 각 주파수 별 트랜스폰더(TP)들을 도시하고 있다.
도 2를 참조하면, 도 2의 좌측 중앙부의 좌측 하단의 설정까지 주파수대역 (Freq.) 및 트랜스포더 (TP)가 나타나 있다. TP (transponder)는 트랜스포더 (transponder)로, 트랜스포더 (transponder)는 TS를 특정 주파수를 이용해서 전송하는 물리적인 장비일 수 있다. TP (transponder)는 여러 채널을 포함하는 하나의 주파수 대역을 의미할 수도 있다. 일반적으로 채널은 서비스 (service)로 언급되기도 한다. 따라서, TP는 여러 서비스를 포함하는 특정 주파수 대역을 의미한다고 할 수 있다.

예를 들어, 도 2를 참조하면, 10729 MHz 주파수 대역의 TP (transponder) 번호는 50이며 채널이름은 canal+이다. 10744 MHz 주파수 대역의 TP 51을 참조하면, 10744 MHz 주파수 대역에는 ARD digital, Tagesschau 24, Einsfestival 및 Eins Plus와 같은 복수의 채널이 존재함을 알 수 있다.

각 채널(또는 서비스)의 AV 데이터 (Audio Video data)를 추출하기 위한 PID 가 도 2에 도시되어 있다. 예를 들어, TP 51의 tagesschau 24 채널을 서비스 하기 위한 비디오 PID (Video PID; VID)는 101이고, 오디오 PID (Audio PID; APID)는 102인 것을 알 수 있다. 같은 방식으로, Pheonix 채널을 서비스 하기 위한 VPID는 501이고 APID는 503이다.

도 3은 본 발명의 일 실시 예에 따른 채널 변경 장치 (360)의 구성도 나타내는 볼록도이다.
도 3을 참조하면, 본 발명의 일 실시예에 따른 채널 변경 장치(360)는 예컨대, TS수신기에 구비될 수 있다. 여기서 TV 수신기는 예컨대 셋톱박스, 스마트 TV 등과 같이 TS를 수신하고 재생할 수 있는 장치일 수 있다. 이러한 채널 변경 장치는 수신부(310), 튜너부(320), PSI관리부(330), 제어부(340) 및 출력부(350) 등을 포함할 수 있다.

수신부(310)는 전파를 받아들이는 수신 수단을 의미할 수 있다. 예컨대 수신부(310)는 안테나일 수 있다. 이러한 수신부는 수신한 신호를 튜너부(320)로 전달할 수 있다.

튜너부(320)는 수신부로부터 수신된 신호를 기반으로 튜닝을 수행할 수 있다. 예를 들어, 튜너부(320)는 특정 주파수대역의 TS를 받아들여기 위해 주파수 대역을 특정하여 TS를 수신하기 위한 튜닝을 수행할 수 있다. 이러한 튜너부(320)는 복수의 튜너를 포함하며, 하나의 튜너를 사용하여 하나의 주파수 대역의 TS를 받을 수 있고 다수의 튜너를 사용하여 하나의 주파수 대역의 TS를 받을 수도 있다. 또한, 튜너부(320)는 다수의 튜너를 사용하여 다수의 주파수 대역의 TS를 받아들일 수도 있다. 각 주파수 대역을 튜너로 튜닝을 하면, 튜너부(320)는 각 주파수 대역에 따른 TS를 수신할 수 있다.

튜너부(320)는 수신 신호로부터 생성한 TS 및 기타 정보를 PSI 관리부(330) 및 제어부(340)로 전달할 수 있다. 한편으로, 본 발명의 다른 실시 예에서는 튜너부(320)가 PSI관리부(330)로 직접 정보를 전달(322)하지 않을 수도 있는데, 이 경우에는 다른 계체에 의하여 간접적으로 정보가 전달된다. 예를 들면, 제어부
(340)가 제어부(340)로 전달된 정보(321)를 PSI 관리부(330)로 전달할 수도 있다.

PSI관리부(330)는 각 채널의 PSI(Program Specific Information)를 관리할 수 있다. PSI는 TS 내의 프로그램 스트림들의 다중화 내용 및 네트워크 정보를 포함할 수 있다. 예를 들어, PSI는 PAT(Program Association Table), PMT(Program Map Table) 또는 CAT(Conditional Access Table) 등을 포함할 수 있다. 상기 PAT는 PMT들의 PID 등을 담고 있는 테이블이다. PAT의 PID는, 예컨데, 0일 수 있다. PMT는 각 프로그램을 구성하는 오디오, 비디오, 데이터 스트림의 PID를 담고 있는 테이블이다. CAT는 제한수신관리 정보를 가지고 있는 테이블이다. PSI관리부(330)는 PID 등의 채널 정보를 추출하고, 추출한 PID 등의 채널 정보를 제어부(340)로 전달할 수 있다.

제어부(340)는 채널 변경 장치의 전체적인 동작을 제어할 수 있다. 예를 들면, 제어부는 수신부(310), 튜너부(320), PSI관리부(330) 및 출력부(350) 등의 상호 작용, 데이터 흐름 등을 제어할 수 있다. 이로인하여, 본 발명의 다른 실시 예에서, 제어부(340)는 PSI관리부(330)의 기능을 수행하도록 구현될 수도 있다.

이러한 제어부(340)는, 각 채널을 서비스하기 위하여, TS를 오디오, 비디오 및 데이터부분으로 분리(deMUX)한다. 예컨데, 제어부(340)는 TS를 비디오, 오디오 등으로 분리하기 위하여, 앞서 언급한 바 있는 PID를 사용할 수 있다. 여기서 PID는 PMT에 포함되어 있을 수 있다.

또한, 제어부(340)는 PMT를 열기 위해 튜너를 TP의 주파수 대역으로 튜닝하
여 TS를 얻은 후 그로부터 PSI를 얻고, PSI에의 PAT에서 해당되는 채널의 PMT를 추출할 수 있다. 그리고 제어부(340)는 PMT내의 PID를 추출한다. 즉, 제어부(340)는 채널 변환시 PSI 정보들에서 PID를 추출한 후 추출한 PID를 사용하여 오디오 및 비디오 데이터를 추출할 수 있다. 이러한 경우 채널 변환에 일정시간이 요구되게 된다.

본 발명의 일 실시 예에 따른 채널 변환 장치는 복수의 튜너를 사용하여 복수의 TS에 포함된 다수 ES(Elementary stream)의 PID 정보를 PSI 관리부(340)에 미리 저장할 수 있다. 보다 상세히 설명하면, PSI 관리부(330)는 얻어진 TS로부터 PSI를 얻고, 얻어진 PSI에의 PAT에서 해당되는 채널의 PMT를 추출할 수 있다. 그리고 PSI 관리부(330)는 추출된 PMT내의 PID를 추출한다. 그리고 PSI 관리부(330)는 추출된 PID를 제어부(340)의 요청에 따라 제공한다. 즉, PSI 관리부(330)는 채널 변환의 여부와 관계없이 복수의 TS의 PSI 정보들에서 PID를 추출한 후 추출한 PID를 저장하고 있다. 제어부(340)는 채널 변환시 PSI관리부(330)에 변경하려는 채널의 PID를 요청하며, PSI 관리부(330)는 제어부(340)의 요청에 따라 해당되는 채널의 PID를 제공한다. 제어부(340)는 PSI 관리부(330)로부터 수신한 PID를 사용하여 오디오 및 비디오 데이터를 추출할 수 있다. 이 경우 채널 변경시 제어부(340)가 TS에서 PID를 추출하는 일련의 과정을 생략할 수도 있다. 채널 변환에 요구되는 시간을 단축할 수 있다.

PSI는 시간의 흐름에 따라 변경될 수 있는 값으로, 복수의 튜너를 가지고 있는 셋탑박스의 경우 사용되고 있지 않는 튜너 자원을 사용하여 검색된 모든 TP들의
PSI 데이터를 적어도 하나 수신하여 ES(Elementary stream)의 PID 정보를 주기적으로 추출할 수 있다. 따라서 특정 트너로는 TS의 수신을 수행하고 다른 트너로는 다른 TS의 PSI, PAT, PMT 또는 PID 정보와 같은 채널 정보를 추출할 수 있다.

이때 다른 TP를 탐색할 수 있는 트너가 둘 이상인 경우, 사용할 수 있는 트너를 모두 사용하여 다수 TP에서 동시에 복수의 채널 정보를 추출할 수 있다. 이때 추출되는 정보는 채널 변경시 주요되는 시간을 단축시키는 모든 정보를 포함할 수 있다. 예를 들어, SI(System Information) 및 PSI(Program Specific Information) 등의 정보가 있다.

추출된 채널 정보는 도스에 도시되지 않았지만 램(RAM) 또는 플래시 메모리에 저장될 수 있다. 채이부(340)는 램 또는 플래시 메모리에 저장된 채널 정보를 사용하여, 채널 전환 시 PID의 추출 없이 트너의 트닝 후 바로 AV 블러터링을 수행하여 오디오 및 비디오를 재생할 수 있다.

본 발명의 다른 사례 예로서, TS 생성기(100)에서 생성되어 TS 수신기(300)로 전송되는 PSI 정보는 PSI_other, PAT_other, PMT_other 및 PID_other 중 적어도 하나를 더 포함할 수 있다. 여기서 PSI_other는 해당 TS에 속하지 않는 적어도 하나의 다른 TS의 PSI 집합이다. 같은 방식으로, PAT_other는 해당 TS가 아닌 적어도 하나의 다른 TS의 PAT 값을 나타내는 파라미터이며, 그러한 파라미터의 집합이다. PMT_other는 해당 TS가 아닌 적어도 하나의 다른 TS의 PMT 값을 나타내는 파라미터이며, 그러한 파라미터의 집합이다. PID_other 또한 적어도 하나의 다른 TS의 PID 값을 나타내는 파라미터이며, 그러한 파라미터의 집합이다. 이러한 경우 복수의 튜
너를 포함하지 않더라도 해당 TS의 수신과 함께 다른 TP의 PSI, PAT, PMT 또는 PID 를 해당 TS로부터 주기적으로 추출할 수 있다.

이하에서는, 본 발명의 일 실시 예에 따른 채널 변경 방법을 설명하기로 한다. 이하의 설명에서 채널 변경 장치의 구성과 동작 또한 더욱 명확해 질 것이다.

도 4는 본 발명의 일 실시 예에 따른 채널 변경 방법의 흐름을 설명하기 위한 순서도이다.

도 4에 도시된 바와 같이, 먼저 튜너(320)는, 제어부의 제어에 응답하여, 수신 신호를 특정 TP의 주파수 대역으로 트닝할 수 있다(S410). 이러한 트닝에 의하여 특정 TS가 얻어진다. PSI관리부(330)는 TS로부터 PSI를 추출하고, 추출된 PSI로부터 PID를 추출한다(S420). 다음으로 제어부(340)는 PSI 관리부(330)에서 추출된 PID를 사용하여 TS로부터 오디오 및 비디오 데이터를 추출하고, 추출된 오디오 및 비디오 데이터를 출력부(350)를 사용하여 표시함으로써 미디어의 스트리밍을 진행한다(S430).

다음으로, PSI관리부(330)는 미디어 데이터의 스트리밍 중 다른 채널의 PSI 정보를 채취한다(S440). 그리고 PSI관리부(330)는 채취한 PSI 정보로부터 PID를 추출한다. 본 발명의 일 실시 예에 따른 채널 변경 장치의 특수한 튜너를 사용할 경우, 미디어 데이터를 스트리밍 하기 위해 특정 TS를 수신하는 튜너 외에 휴지 상태인 튜너를 사용하여 다른 채널의 정보를 취득할 수 있다. 또한, 본 S440 단계는
정기적으로 이루어질 수도 있다.

본 S440 단계에서 PSI 정보를 취득하는 것은 예시적인 것으로, PSI 관리부가 취득하는 채널 정보로는 PSI 뿐만 아니라 SI, PAT, PMT, PID 및 기타 다른 정보일 수 있다. PID는 PAT 또는 PMT에 포함되어 TS 생성기(100)로부터 TS 수신기(300)로 전송될 수 있다.

또한, 수신되는 TS는 수신되는 채널의 채널정보를 제외한 복수의 채널의 정보를 포함하는 PSI_other를 기존의 PSI와 별도로 포함하여, S440단계는 PSI_other를 취득하는 것으로 수행될 수 있다. 이러한 경우 다른 채널의 채널 정보를 취득하기 위해 별도의 트너가 요구되지 않는다.

유사한 방식으로 TS에 PAT_other, PMT_other 및 PID_other 중 적어도 하나가 포함되어 상기 S440단계는 PAT_other, PMT_other 및 PID_other 중 적어도 하나를 취득하는 것으로 수행될 수도 있다. PAT_other는 PAT의 집합표현으로 배열, 리스트 기타 형식으로 표현될 수 있다. 유사한 방식으로 PMT_other 및 PID_other 또한 PMT, PID의 집합으로 각각 표현될 수 있다.

또한, TS에 포함되는 PSI는 다른 TS의 PSI정보들을 모두 포함할 수 있다. 이러한 경우 TS의 해당 PSI와 다른 TS들의 PSI를 구분하기 위한 actual 필드를 더 포함할 수 있다. 이때 PSI는 배열, 리스트 기타 형식으로 TS에 포함될 수 있다. 유사한 방식으로 PAT, PMT 및 PID중 어느 하나라도 다른 TS의 PAT, PMT 및 PID 정보와 함께 TS에 포함될 수 있고, 이때 TS에는 자기 PAT, PMT, PID 정보와 다른 TS의 PAT, PMT PID 정보를 구분하게 하는 actual 필드도 함께 포함될 수 있다. 이러한 경우
TS의 자기 정보와 다른 TS의 정보를 구분하려는 actual 필드는 사용되지 않고, 
TS의 자기 정보를 구분하기 위하여 TS의 해당 자기 정보는 복수의 PSI, PAT, PMT, 
PID 및 기타 정보들 중에서 특정 순서에 위치할 수 있다.

마지막으로, 채널의 변경 신호가 발생될 경우 채널 변경 신호를 수신하기 전 
제취득한 PSI 정보를 사용하여 추출한 PID를 사용하여 변경된 채널의 TS에서 오디오 및 
비디오 데이터를 추출한다(S450). 채널 정보를 제취득하는 단계(S440)에서 
취득한 채널 정보는 메모리에 저장될 수 있다. 이러한 경우 제취득한 PSI 정보는 
상기 메모리에 저장된 PSI 정보를 사용할 수 있다. 채널 변경 신호를 수신하는 것 
은 TS 수신기(300)가 채널 정보를 표시부에 표시하여 유발된 사용자의 채널 변경 
입력을 수신하는 것으로 수행될 수 있다.

이하 본 발명의 일 실시 예에 따른 PAT와 PMT의 구성을 설명한다. 도 5는 종 
래의 PAT 구성이다. 도 6은 종래의 PMT 구성이다. 도 7은 본 발명의 일 실시 예에 
따른 transport_stream_id의 구성이다. 도 8은 본 발명의 다른 실시 예에 따른 PAT 
구성이다. 도 9는 본 발명의 일 실시 예에 따른 PMT 구성이다.

도 5를 참조하면, PAT에는 TS의 ID를 나타내는 transport_stream_id 필드 
가 존재한다. 종래의 PAT의 구조에서는 다른 TS의 정보를 표현할 수 없다.

도 7은 본 발명의 일 실시 예에 따른 transport_stream_id의 구성이다. 도 5
의 transport_stream_id는 도 7과 같이 복수의 TS의 ID를 나타내도록 구성될 수 있다. 본 발명의 일 실시 예에 따른 transport_stream_id는 여러 가지 형태로 구성될 수 있다. 예를 들어 도 7에 도시된 transport_stream_id를 참조하면, 해당 TS의 ID를 나타내는 Actual_transport_stream_flag가 제일 먼저 나타나고, 그 뒤로 다른 TS의 ID들이 transport_stream_id1, transport_stream_id2, ..., transport_stream_idn과 같이 순차적으로 나타날 수 있다.


도 6은 종래의 PMT 구성이다. 도 6을 참조하면 종래의 PMT는 TS에서 관련되
는 PAT와 함께 전송되고 수신되므로 관련되는 TS의 ID를 나타내는 필드를 포함하지
않는다.

또한 본 발명의 제2 실시 예에 따른 채널 변경 방법에서, 다른 TS에 속한
PMT도 함께 TS에서 속하여 전송될 수 있다. 이러한 경우 해당 TS에 관련되는 PMT를
인식하기 위하여 PMT에 Transport_stream_id를 더 포함하여야 할 필요가 존재한다.

또한 본 발명의 제3 실시 예에 따른 채널 변경 방법에서, PAT가 복수의 TS의
ID를 포함하는 것과 같이 PMT는 복수의 프로그램 번호(program_number), ES의
PID(elementary_PID)등을 포함할 수 있다.

또한 본 발명의 제4 실시 예에 따른 채널 변경 방법에서, 서로 다른 TS에 속
하는 PAT와 PMT는 자신의 TS의 ID를 나타내는 Transport_stream_id 필드를 더 포함
하도록 구성되고, 하나의 TS에 포함될 수 있다. 이러한 경우 해당 TS에 속하지 않
는 복수의 PAT는 하나의 PAT_other의 형태로 구성되어 TS에 포함되고, 같은 방식으
로 해당 TS에 속하지 않는 복수의 PMT는 하나의 PMT_other의 형태로 구성되어 TS에
포함될 수 있다. 또한 전송한 PAT 및 PMT는 압축되어 구성될 수도 있다.
이상에서 설명한 본 발명은 일련의 기능 블록들을 기초로 설명되고 있지만, 진술한 실시 예 및 구성된 도면에 의해 한정되는 것이 아니고, 본 발명의 기술적 사상을 벗어나지 않는 범위 내에서 여러 가지 형태, 변경 및 변경이 가능하다는 것이 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자에게 있어 명백할 것이다.

진술한 실시 예들의 조합은 진술한 실시 예에 한정되는 것이 아니며, 구현 및 또는 필요에 따라 진술한 실시 예들 뿐만 아니라 다양한 형태의 조합이 제공될 수 있다.

진술한 실시 예들에서, 방법들은 일련의 단계 또는 블록으로서 순서대로 기초로 설명되고 있으나, 본 발명은 단계들의 순서에 한정되는 것은 아니며, 어떤 단계는 상술한 바와 다른 단계와 다른 순서로 또는 동시에 발생할 수 있다. 또한, 당해 기술 분야에서 통상의 지식을 가진 자라면 순서도에 나타난 단계들이 배타적이지 않고, 다른 단계가 포함되거나, 순서도의 하나 또는 그 이상의 단계가 본 발명의 범위에 영향을 미치지 않고 삭제될 수 있음을 이해할 수 있을 것이다.

진술한 실시 예는 다양한 형태의 예시들을 포함한다. 다양한 형태들을 나타내기 위한 모든 가능한 조합을 기술한 수는 없지만, 해당 기술 분야의 통상의 지식을 가진 자는 다른 조합이 가능함을 인식할 수 있을 것이다. 따라서, 본 발명은 이하의 특허청구범위 내에 속하는 모든 다른 교체, 수정 및 변경을 포함한다고 할 것이다.
【청구항 1】

미디어 재생 장치에 의해 수행되는 채널 변경 방법에 있어서,

튜너를 사용하여 복수의 채널 정보를 취득하는 단계;

채널 변경 신호를 수신하는 단계; 및

상기 취득한 채널정보를 사용하여 상기 채널 변경 신호에 따른 채널의 데이터를 생성하는 단계를 포함하는 것을 특징으로 하는 채널 변경 방법.

【청구항 2】

제 1 항에 있어서,

상기 채널정보는 상기 복수 채널의 PSI (PROGRAM SPECIFIC INFORMATION)에 포함된 PID인 것을 특징으로 하는 채널 변경 방법.

【청구항 3】

제 2 항에 있어서,

상기 채널의 데이터를 생성하는 단계는 상기 PID를 사용하여 상기 채널의 오디오 및 비디오 데이터 중 적어도 하나를 생성하는 단계를 포함하는 것을 특징으로 하는 채널 변경 방법.
【청구항 4】

제 1 항에 있어서.

상기 채널 정보는 복수 전송 스트림(Transport Stream)의 식별자를 포함하는 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송되는 것을 특정으로 하는 채널 변경 방법.

【청구항 5】

제 1 항에 있어서.

상기 채널 정보는 전송 스트림(Transport Stream)의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송되며.

상기 채널 정보는 상기 전송 스트림의 채널정보를 제외하고 다른 복수의 전송 스트림(Transport Stream)의 채널 정보를 포함하는 것을 특정으로 하는 수신채널 변경 방법.

【청구항 6】

제 4 항에 있어서.

상기 PAT 또는 PMT는 자신이 포함된 전송 스트립을 나타내는 식별자를 더 포함하는 것을 특정으로 하는 채널 변경 방법.
【청구항 7】

제 1 항에 있어서.

상기 복수의 채널 정보를 취득하는 단계는,

가용 튜너 및 데이터 수신을 하지 않고 있는 튜너 중 어느 하나를 사용하여
상기 채널들의 채널 정보를 취득하는 단계를 포함하는 것을 특징으로 하는 채널 변경 방법.

【청구항 8】

제 1 항에 있어서.

상기 복수 채널의 채널 정보를 취득하는 단계는,

특정 채널의 데이터 수신 중에 다른 채널의 채널정보를 취득하는 단계를 포
함하는 것을 특징으로 하는 채널 변경 방법.

【청구항 9】

미디어 재생 장치의 채널 변경 장치에 있어서.

복수의 채널 데이터를 취득하는 적어도 하나의 튜너; 및

상기 채널 데이터에서 채널 정보를 추출하고, 수신되는 채널 변경 신호에 따
라 상기 신취득한 채널정보를 사용하여 채널의 데이터를 생성하는 제어부를 포함하
는 것을 특징으로 하는 채널 변경 장치.
【정구항 10】

제 9 항에 있어서.

상기 채널정보는 상기 복수 채널의 PSI(PROGRAM SPECIFIC INFORMATION)에 포함된 PID인 것을 특징으로 하는 채널 변경 장치.

【정구항 11】

제 10 항에 있어서.

상기 채널정보는 상기 PID를 사용하여 상기 채널의 오디오 및 비디오 데이터 중 적어도 하나를 생성하는 것을 특징으로 하는 채널 변경 장치.

【정구항 12】

제 9 항에 있어서.

상기 채널 정보는 복수 전송 스트림(Transport Stream)의 식별자를 포함하는 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송되는 것을 특징으로 하는 채널 변경 장치.

【정구항 13】

제 9 항에 있어서.
상기 채널 정보는 전송 스트림(Transport Stream)의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)에 포함되어 전송되며.

상기 채널 정보는 상기 전송 스트림의 채널정보를 제외하고 다른 복수의 전송 스트림(Transport Stream)의 채널 정보를 포함하는 것을 특징으로 하는 채널 변경 장치.

【청구항 14】

제 13 항에 있어서.

상기 PAT 또는 PMT는 자신이 포함된 전송 스트림을 나타내는 식별자를 더 포함하는 것을 특징으로 하는 채널 변경 장치.

【청구항 15】

제 9 항에 있어서.

상기 제어부는 상기 트너부의 적어도 하나의 트너들 중에서 사용 트너 및 데이터 수신을 하지 않고 있는 트너 중 어느 하나를 사용하여 상기 채널들의 채널 정보를 취득하는 것을 특징으로 하는 채널 변경 장치.

【청구항 16】

제 9 항에 있어서.
상기 제어부는 특정 채널의 데이터 수신 중에 다른 채널의 채널정보를 취득하는 것을 목적으로 하는 채널 변경 장치.

【청구항 17】

제 9 항에 있어서

상기 제어부는 취득한 채널 정보를 메모리에 저장하고,

상기 채널 변경 신호에 따라 상기 메모리에 저장된 상기 채널 정보를 사용하여 채널 변경을 수행하는 것을 목적으로 하는 수신채널 변경 장치.

【청구항 18】

미디어 데이터 전송 패킷에 있어서,

특수의 미디어 데이터 전송 스트림의 식별자를 포함하는 것을 목적으로 하는 미디어 데이터 전송 패킷.

【청구항 19】

제 18 항에 있어서,

상기 미디어 데이터 전송 패킷은 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)를 포함하고,

상기 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)는 상기
복수의 디지털 데이터 전송 스트림 식별자를 포함하는 것을 특정으로 하는 미디어 데이터 전송 패킷.

【청구항 20】

제18항에 있어서,

상기 미디어 데이터 전송 패킷은 복수의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)를 포함하고,

상기 각각의 PAT(PROGRAM ASSOCIATION TABLE) 또는 PMT(PROGRAM MAP TABLE)는 상기 복수의 미디어 데이터 전송 스트림 식별자를 각각 포함하는 것을 특정으로 하는 미디어 데이터 전송 패킷.
[요약서]

[요약]
본 발명은 채널 변경이 발생하기 전에 미리 생성한 채널 정보를 사용하여 변경된 채널의 오디오 및 비디오 데이터를 생성함으로써, 채널 변경시 변경될 채널의 채널 정보를 산출하는 과정을 생략하여 채널 계정 탐임을 줄이는 채널 변경 방법 및 그 장치를 제공한다.

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<th>QPSK (1/2)</th>
<th>EIRP PA</th>
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<td>for (j=α; j&lt;n; j++)</td>
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<tr>
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</tr>
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<tr>
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</tr>
<tr>
<td>network_PID</td>
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<td>}</td>
</tr>
<tr>
<td>else{</td>
</tr>
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<tr>
<td>CRC_32</td>
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TS_program_map_section()
  table_id
  section_syntax_indicator
'0' reserved
  section_length
  program_number reserved
  version_number current_next_indicator
  section_number last_section_number reserved
  PCR_PID reserved
  Program_info_length
  for ( i=0; i<N1 ; i+=1)
  {
    descriptor()
  }
  for ( i=0; i<N1 ; i+=1)
  {
    stream_type reserved
    elementary_PID reserved
    ES_info_length
    for ( j=0; j<N2 ; j+=1)
    {
      descriptor()
    }
  }
  CRC_32
}

【표 7】

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38-38
선택

Program_association_section(){
    table_id
    section_syntax_indicator '0'
    reserved
    section_length
    transport_stream_id
    actual_transport_stream_flag
    reserved
    version_number
    current_next_indicator
    section_number
    last_section_number
    for (j=0; j<n ; j++){
        program_number
        reserved
        if(program_number==0){
            network_PID
        }
        else{
            Program_map_PID
        }
    }
    CRC_32
}
<table>
<thead>
<tr>
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</tr>
</thead>
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<tr>
<td>TS_program_map_section()</td>
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# PATENT APPLICATION FEE DETERMINATION RECORD

**Substitute for Form PTO-875**

**Application or Docket Number:** 14/174,163

## APPLICATION AS FILED - PART I

<table>
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<th>FOR</th>
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### APPLICATION SIZE FEE (37 CFR 1.16(a))

- If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(e).

### MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))

* If the difference in column 1 is less than zero, enter “0” in column 2.

## APPLICATION AS AMENDED - PART II

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* If the entry in column 1 is less than the entry in column 2, write “0” in column 3.

**Note:**
- If the “Highest Number Previously Paid For” in THIS SPACE is less than 20, enter “20”.
- If the “Highest Number Previously Paid For” in THIS SPACE is less than 3, enter “3”.
- The “Highest Number Previously Paid For” (Total or Independent) is the highest found in the appropriate box in column 1.
United States Patent and Trademark Office

Application Number
Filing or 371(c) Date
艺术
Fee Recd
Attorney Docket No
Total Claims
Invention Claims
22429
Lowe Hauptman & Ham, LLP
2318 Mill Road
Suite 1400
Alexandria, VA 22314

CONFIRMATION NO. 6315
FILING RECEIPT

Date Mailed: 02/25/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections.

Inventor(s)
Tae Gap Kim, Seongnam-si, Korea, Republic Of;

Applicant(s)
Humax Co., Ltd., Seongnam-si, Korea, Republic Of

Assignment For Published Patent Application
Humax Co., Ltd., Seongnam-si, Korea, Republic Of

Power of Attorney: The patent practitioners associated with Customer Number 22429

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)
Republic of Korea 10-2013-0051739 05/08/2013

Permission to Access - A proper Authorization to Permit Access to Application by Participating Offices (PTO/SB/39 or its equivalent) has been received by the USPTO.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper Request to Retrieve Electronic Priority Application(s) (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 02/20/2014
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/174,163**

**Projected Publication Date:** 11/13/2014

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

**METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE**

**Preliminary Class**

348

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process *simplifies* the filing of patent applications on the same invention in member countries, but *does not result* in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application’s filing receipt contains further information and guidance as to the status of applicant’s license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled “Treaties and Foreign Patents”) for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).
LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.
NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/06/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/ewondimu/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101
UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents.

1. Fee Transmittal Form.
   (PTO/SB/17 or equivalent)

2. Applicant claims small entity status.
   See 37 CFR 1.27.

   [Total Pages 26 ]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP § 803.01(a))

4. Drawing(s).
   (35 U.S.C. 113) [Total Sheets 9 ]

5. Inventor’s Oath or Declaration.
   [Total Sheets 1 ]
   (including substitute statements under 37 CFR 1.64 and assignments serving as an
   oath or declaration under 37 CFR 1.63(i))
   a. Newly executed (original or copy)
   b. A copy from a prior application (37 CFR 1.63(d))

6. Application Data Sheet. *See Note below.
   See 37 CFR 1.76 (PTO/AIA/14 or equivalent)

7. CD-ROM or CD-R.
   in duplicate, large table or Computer Program (Appendix)
   Landscape Table on CD

8. Nucleotide and/or Amino Acid Sequence Submission.
   (if applicable, items a. – c. are required)
   a. Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. CD-ROM or CD-R (2 copies); or
      ii. Paper
   c. Statements verifying identity of above copies

*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

18. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 22429 OR ☐ Correspondence address below

Name

Address

City State Zip Code
Country

Telephone Email

Signature /Yoon S. Ham/ Date 2014-02-06

Name (Print/Type) Yoon S. Ham Registration No. (Attorney/Agent) 45307

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
Application Data Sheet 37 CFR 1.76

Attorney Docket Number 5607-0003

Application Number

Title of Invention  METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

<table>
<thead>
<tr>
<th>Inventor 1</th>
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<tbody>
<tr>
<td>Legal Name</td>
</tr>
<tr>
<td>Prefix</td>
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<tr>
<td>Tae Gap</td>
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<tr>
<td>Residence Information (Select One)</td>
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</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Postal Code</td>
</tr>
</tbody>
</table>

Mailing Address of Inventor:

| Address 1 | Suite 201, 4-6, 139 beon-gil, Sanwoon-ro |
| Address 2 | Bundang-gu |
| City | Seongnam-si, Gyeonggi-do | State/Province |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number 22429

Email Address yshgroup@ipfirm.com

Add Email Remove Email

Application Information:

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<th>Title of the Invention</th>
<th>METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE</th>
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Application Data Sheet 37 CFR 1.76

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Publication Information:

- [ ] Request Early Publication (Fee required at time of Request 37 CFR 1.219)
- [ ] Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer number will be used for the Representative Information during processing.

Please Select One: [ ] Customer Number [ ] US Patent Practitioner [ ] Limited Recognition (37 CFR 11.9)

Customer Number 22429

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

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Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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<th>Application Number</th>
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<th>Access Code (if applicable)</th>
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Additional Foreign Priority Data may be generated within this form by selecting the Add button.
Application Data Sheet 37 CFR 1.76

| Title of Invention | METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE |

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.
Application Data Sheet 37 CFR 1.76

Title of Invention: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an assignee under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Assignee
Legal Representative under 35 U.S.C. 117
Joint Inventor

Person to whom the inventor is obligated to assign.
Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☑

Organization Name: Humax Co., Ltd.

Mailing Address Information For Applicant:

Address 1: Humax Village, 216, Hwangsaeful-ro, Bundang-gu

City: Seongnam-si, Gyeonggi-do

Country: KR

State/Province

Postal Code: 463-875

Phone Number

Fax Number

Email Address

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Assignee Information" section will appear on the patent application publication as an assignant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee is an Organization check here. ☐
**Application Data Sheet 37 CFR 1.76**

<table>
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**Title of Invention**

METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUISITED PSI TABLE

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**Mailing Address Information For Non-Applicant Assignee:**

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Additional Assignee Data may be generated within this form by selecting the Add button.

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

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<th>Signature</th>
<th>Date (YYYY-MM-DD)</th>
<th>2014-02-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>/Yoon S. Ham/</td>
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<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Registration Number</th>
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</thead>
<tbody>
<tr>
<td>Yoon S.</td>
<td>Ham</td>
<td>45307</td>
</tr>
</tbody>
</table>

Additional Signature may be generated within this form by selecting the Add button.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.
POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 C.F.R. §3.73(e).

I hereby appoint practitioners associated with Customer Number: 22429

Lowe Hauptman & Ham, LLP
Telephone: +1-703-684-1111
Email: docketing@ipfirm.com
www.ipfirm.com

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Please change the correspondence address for the application identified in the attached statement under 37 C.F.R. §3.73(c) to the address associated with Customer Number: 22429

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<td>Name: HUMAX CO., LTD.</td>
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Address:
2 Yeongmunro, Yubang-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-934
Republic of Korea

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Tae Gap Kim

Application No./Patent No.: ___________________________ Filed/Issue Date: 2014-02-06

Titled: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

HUMAX CO., LTD. __________ a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
   - ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for 100% of the ownership interest.
   - ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

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3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

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4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

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[Page 1 of 2]

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STATEMENT UNDER 37 CFR 3.73(c)

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The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Yoon S. Ham/                                             2014-02-06
Signature                                              Date
Yoon S. Ham
Printed or Typed Name

45307
Title or Registration Number
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AIA Declaration
BPP2013-0334US

Attorney Docket No. Application No. PATENT
First Named Inventor: KIM, Tae Gap Confirmation No.

Title: METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-
ACQUIRED PSI TABLE

DECLARATION (37 C.F.R. §1.63) FOR UTILITY OR DESIGN APPLICATION

As the below named inventor, I hereby declare that:

This declaration is directed to either the attached application, or the above identified
United States application or PCT international application number PCT/________ filed
______________.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed
invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is
punishable under 18 U.S.C. §1001 by fine or imprisonment of not more than (5) years, or both.

Direct all correspondence to the address associated with Customer Number: 22429

Lowe Hauptman & Ham, LLP
Telephone: +1-703-684-1111
Email: docketing@ipfirm.com
www.ipfirm.com

Legal Name of Sole or First Inventor:
KIM, Tae Gap

Inventor’s Signature: Date (Optional):
17 Sep 2013

Residence: City State Country
Seongnam-si Republic of Korea

Mailing address
Suite 201, 4-6, 139 beon-gil, Sanwoon-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

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**Title of Invention:** METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

**First Named Inventor/Applicant Name:** Tae Gap KIM

**Filer:** Yoon Ham/Sunny HAN

**Attorney Docket Number:** 5607-0003

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

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**Title of Invention:** METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

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METHOD AND APPARATUS OF CHANNEL SWITCHING USING PRE-ACQUIRED PSI TABLE

Priority to Korean patent application number 2013-0051739 filed on May 8, 2013, the entire disclosure of which is incorporated by reference herein, is claimed.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention is related to a method for receiving broadcast signals, more specifically, a method for switching broadcast channels.

Discussion of the Related Art

IPTV services, which provide two-way TV services through the Internet, are in common use along with the TV services using conventional broadcasting networks. An IPTV is connected to a set-top box which converts IP video signals to standard TV signals and if a switched video service (SVS) system is used, can connect selectively to a broadband network channel or a service such as a subscriber service and a movie according to a user's preference.

The IPTV has advantages such as high quality video and various additional services as well as two-way interactivity not found in the analog broadcasting such as the conventional terrestrial broadcasting.

Despite these advantages, when a user watching a particular channel attempts to switch to another one, conventional IPTVs cause a time delay (zapping delay) longer than that of analog broadcasting until channel switching is completed. The channel zapping time developed at the time of switching channels of IPTVs results from a
transmission and reception method used for the IPTVs; thus, there needs a method for reducing the channel zapping time in a broadcasting system such as the IPTV.

**SUMMARY OF THE INVENTION**

To solve the aforementioned problem, the present invention provides a method and apparatus for switching channels which reduce channel zapping time inherent in channel switching.

In a method for switching channels carried out by a media play apparatus, a method for switching channels according to one embodiment of the present invention intended to solve the aforementioned problem comprises obtaining information about a plurality of channels; receiving a channel switching signal; and generating channel data according to the channel switching signal by using the obtained channel information.

The obtaining information about a plurality of channels can comprise obtaining channel information by using at least one idling tuner among a plurality of tuners.

The obtaining channel information by using at least one idling tuner among a plurality of tuners can comprise obtaining channel information of a channel not included in a transport stream under reception.

The channel information can be transported being contained in a program association table (PAT) or program map table (PMT) including identifiers for a plurality of transport streams.

The PAT or PMT can further include an identifier indicating a transport stream in which the PAT or PMT is included.

The channel information can be transported being contained in the PAT or PMT of a transport stream, and the channel information can further include channel information of a channel contained in another transport stream.
The obtaining information of a plurality of channels can comprise obtaining channel information by using an IP network.

The obtaining information about a plurality of channels can comprise receiving channel information from a transport stream received by using a tuner; and receiving channel information of a channel not included in the transport stream from a server by using an IP network.

Also, in an apparatus for switching channels of a media play apparatus, an apparatus for switching channels according to one embodiment of the present invention to solve the aforementioned problem comprises at least one tuner obtaining information about a plurality of channels; and a controller extracting channel information from the channel data and generating channel data according to a received channel switching signal by using the previously obtained channel information.

The apparatus for switching channels can obtain the channel information by using at least one idling tuner.

The idling tuner can obtain channel information of a channel not included in a transport stream under reception.

The channel information can be transported being contained in a PAT or PMT including identifiers of a plurality of transport streams.

The channel information can correspond to a PAT or PMT which includes only channel information of a channel contained in another transport stream.

The channel information is a PAT or PMT which further includes channel information of a channel included in another transport stream, and the PAT or PMT can further include an identifier indicating a transport stream in which the PAT or PMT is included.

The apparatus for switching channels can further comprise an IP transceiver
which receives channel information from a server by using an IP network.

The IP transceiver can receive channel information of a channel from a server, the channel being not included in a transport stream received through the tuner.

The apparatus for switching channels can further comprise memory in which obtained channel information is stored, and the controller can store the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and perform channel switching according to the channel switching signal by using the channel information stored in the memory.

Also, in a media data transport packet, a media data transport packet according to one embodiment of the present invention to solve the aforementioned problem comprises transport stream identifiers for a plurality of media data.

The media data transport packet includes a PAT or PMT, and the PAT or PMT can each include the transport stream identifier for a plurality of media data.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the present invention and constitute a part of specifications of the present invention, illustrate embodiments of the present invention and together with the corresponding descriptions serve to explain the principles of the present invention.

FIG. 1 is a conceptual illustration of generating and transporting a transport stream;

FIG. 2 shows various channels allocated in the respective frequency bands;

FIG. 3 is a block diagram of an apparatus for switching channels according to one embodiment of the present invention;
FIG. 4 is a flow diagram of a method for switching channels according to one embodiment of the present invention;

FIG. 5 illustrates the conventional PAT;

FIG. 6 illustrates the conventional PMT;

FIG. 7 illustrates a transport_stream_id according to one embodiment of the present invention;

FIG. 8 illustrates a PAT according to another embodiment of the present invention; and

FIG. 9 illustrates a PMT according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention can be modified in various ways and various embodiments of the present invention can be realized; thus, this document illustrates particular embodiments in the appended drawings and detailed description of the embodiment will be provided.

That is not meant, however, for limiting the present invention to the particular embodiments; rather, it should be understood to include every possible modification, equivalent, or substitute of the present invention which belongs to the technical principles and scope of the present invention.

Terms such as first and second can be used for describing various components but the components should not be limited by the terms. The terms are introduced only for the purpose of distinguishing one component from the others. For example, a first component may be called a second component without departing from the scope of the present invention and vice versa. The term of and/or indicates a combination of a plurality of related items described or any one of a plurality of related items described.
If a component is said to be “linked” or “connected” to a different component, the component may be directly linked or connected to the different component but a third component may exist to connect the two components even though the two components may be connected directly. On the other hand, if a component is said to be “linked directly” or “connected directly” to another component, it should be interpreted that there is no further component between the two components.

Terms used in this document have been introduced only to describe particular embodiment, not intended to limit the scope of the present invention. Singular expression should be interpreted to include plural expressions unless otherwise stated explicitly. Terms such as “include” or “have” are meant to signify existence of embodied characteristics, numbers, steps, behavior, components, modules, and combinations thereof, which should be understood that possibility of existence or addition of one or more characteristics, numbers, steps, behavior, components, modules, and combinations thereof are not precluded beforehand.

Unless otherwise defined, all the terms used in this document, whether they are technical or scientific, possess the same meaning as understood by those skilled in the art to which the present invention belongs. The terms such as those defined in a dictionary for general use should be interpreted to carry the same contextual meaning in the related technology, and they should not be interpreted to possess an ideal or excessively formal meaning.

In what follows, with reference to appended drawings, preferred embodiments of the present invention will be described in more detail. To help overall understanding of the present invention, the same components in the drawings use the same reference symbols, and descriptions of the same components are omitted.
FIG. 1 is a conceptual illustration of generating and transporting a transport stream. FIG. 1 illustrates a TS generator 100, TS transporter 200, and TS receiver 300. The TS generator 100 aggregates a movie, news cast, sport program, and data table into a transport stream (TS) by using a multiplexer, and the generated TS is delivered to the TS transporter 200. The TS generated in the TS generator 100 includes a movie, news cast, sport program, and data table. The movie, news, and sport program contains audio, video, and data; and can be played in the TS receiver 300 afterwards. For example, audio, video, and data of a movie are multiplexed in the multiplexer 100a, and a data object containing the movie program is generated. Similarly, news cast and sport program are each multiplexed in the multiplexer 100b, 100c.

The data table includes a PMT (Program Map Table), EPG (Electronic Program Guide), and other information; the data table further includes information related to transport of a TS carried out by the TS transporter 200 and reception and use of a TS by the TS receiver 300. The PMT, EPG, and so on of the data table are multiplexed in the multiplexer 100d, and a data object containing the data table is generated.

The individual data objects generated by multiplexing in the respective multiplexers 100a, 100b, 100c, 100d are multiplexed one more time in a multiplexer 100e, generating a TS.

The TS transporter 200 receives a TS generated in the TS generator 100 and transports the received TS to the TS receiver 300 by using wired or wireless communication. For example, the TS transporter 200 transports a TS by using satellite, terrestrial, cable, or other communication means. The TS transporter 200 transports a TS to a designated frequency band so that each individual TS can occupy a separate frequency band.

The TS receiver 300 can obtain information needed to receive a TS by using
the data table included in the TS. For example, a TS includes a plurality of services such as a movie, news, TV, radio, and data channel. To indicate inclusion of such services as above, the TS can include information such as PAT (Program Association Table), PMT (Program Map Table), and SDT (Service Description Table) in the data table.

FIG. 2 illustrates channels (services) allocated in the respective frequency bands, showing allocated frequency bands of a broadcast satellite, Astra 19.2 and transponders (TPs) for the respective frequency bands.

With reference to FIG. 2, allocated frequency bands (Freq.) and transponders (TPs) are shown from the middle cell down to the bottom cell of the leftmost column. TP stands for transponder and may be a physical apparatus transporting a TS through a particular frequency band. The TP may denote one frequency band comprising multiple channels. A channel is usually referred to as a service. Therefore, the TP may be regarded as a particular frequency band including various services.

For example, with reference to FIG. 2, the number of a TP allocated to 10729 MHz frequency band is 50 and the corresponding channel name is canal+. Referring to the TP 51 allocated to 10744 MHz frequency band, multiple channels such as ARD digital, Tagesschau 24, Einsfestival, and Eins Plus are found in the 10744 MHz frequency band.

Also shown in FIG. 2 is the PID meant for extracting AV (Audio Video) data of each channel (or service). For example, the video PID (VPID) to service tagesschau 24 channel of TP 51 is 101 while the audio PID (APID) is 102. In the same way, it can be known that the VPID to service Phenix channel is 501 while the corresponding APID is 503.
FIG. 3 is a block diagram of an apparatus 360 for switching channels according to one embodiment of the present invention.

With reference to FIG. 3, the apparatus 360 for switching channels according to one embodiment of the present invention can be installed in the TS receiver. The TS receiver may be an apparatus capable of receiving and playing a TS, such as a set-top box and a smart TV. The apparatus for switching channels can comprise an IP transceiver 305, receiver 310, tuner unit 320, PSI managing unit 330, controller 340, and output unit 350.

The IP transceiver 305 renders data received from the controller 340 into IP packets and transmits the IP packets to a network. And the IP transceiver 305 delivers data obtained by receiving IP packets from the network to the controller 340. For example, the IP transceiver 305 can request channel-related information about a particular channel from a server of a broadcasting station and in response to the request, receive from the server the channel-related information of a channel requested through the network. The channel-related information may be PSI information described later.

The receiver 310 may denote a means for receiving radio waves. For example, the receiver 310 may be an antenna. The receiver can deliver a received signal to the tuner unit 320.

The tuner unit 320 can perform tuning based on a signal received from the receiver.

For example, to receive a TS of a particular frequency band, the tuner unit 320 can perform tuning intended for receiving a TS by designating a frequency band. The tuner unit 320 can comprise a plurality of tuners; the tuner unit 320 can receive a TS of one frequency band by using one or more tuners. Also, the tuner unit 320 can receive a
TS from a plurality of frequency bands by using a plurality of tuners. When the individual
tuners are tuned to the respective frequency bands, the tuner 320 can receive a TS
according to each frequency band.

The tuner unit 320 can deliver a TS generated from a received signal and other
information to the PSI managing unit 330 and the controller 340. Meanwhile, in another
embodiment of the present invention, the tuner 320 may not deliver 322 information
directly to the PSI managing unit 330. In this case, the information can be delivered
indirectly by a different entity. For example, the controller 340 may deliver the
information delivered to the controller 340 to the PSI managing unit 330.

The PSI managing unit 330 can manage program specific information (PSI) of
each channel. The PSI can include information about multiplexing of program streams
within a TS and network information. For example, the PSI can include PAT (Program
Association Table), PMT (Program Map Table), or CAT (Conditional Access Table). The
PMT is a table carrying PIDs of PMTs. The PID of a PAT can be zero. The PMT is a
table carrying PIDs of audio, video, and data stream constituting a program. The CAT is
a table carrying conditional access management information. The PSI managing unit
330 can extract channel information such as PID and deliver the extracted channel
information to the controller 340.

The controller 340 can control the overall operation of an apparatus for
switching channels. For example, the controller 340 can control interaction and data
flow of the receiver 310, tuner unit 320, PSI managing unit 330, and output unit 350.
Meanwhile, in another embodiment of the present invention, the controller 340 can be
implemented to carry out a function of the PSI managing unit 330.

The controller 340 demuxes a TS into audio, video, and data part to service
each channel. For example, the controller 340, to separate the TS into video, audio, and
the like, can use the aforementioned PID. At this time, the PMT may carry the PID.

Also, the controller 340, to obtain the PMT, obtains a TS by tuning a tuner to the frequency band of a TP, obtains the PSI from the TS, and extract the PMT of the corresponding channel from the PAT contained in the PSI. In other words, the controller 340 extracts the PID from PSI information at the time of channel switching and by using the extracted PID, extracts audio and video data. In this case, a predetermined time period is required for channel switching.

To reduce the time required for channel switching, PIDs meant for audio and video of a channel can be pre-stored. The controller 340 may search channels for PIDs or store the PIDs by receiving channel information at the time of channel switching. For example, the PID may be a PID of audio or video. The controller 340 can store PIDs of audio and video while searching the channels. For example, the controller 340, while searching the channels by using one tuner, can store PIDs of audio and video of a channel found.

Also, the controller 340 can store PIDs of channels by receiving channel information related to channels switching at the time of channel switching. For example, the related channels may be other channels of a TP including the channels switching or channels belonging to a set comprising channels of interest preset along with the channels switching. In this case, if the PID is changed, the controller 340 can change and store the PID. The controller 340 decides change of PID in case the stored PID differs from the PID of a received channel, or change of a channel’s PID is reflected in the information of the received channel. In case the PID of a channel to be switched is changed, the controller 340 may store PIDs of the whole channels belonging to the TP to which the channel to be switched belongs, or check each PID of the whole channels belonging to the TP to which the channel to be switched belongs whether the PIDs have
changed and store only the PIDs which have been changed. Similarly, irrespective of whether the PID of a channel to be switched has been changed, the controller 340 checks whether the PIDs of channels included in a TP to which the channels to be switched belong have been changed, and if it is found that the PIDs have been changed, the controller 340 stores the PID of the corresponding channel. In this case, too, the controller 340 can store the PID of audio and video data of a switched channel while switching channels by using one tuner.

Also, the controller 340 obtains PIDs by receiving channel information of the whole channels when the apparatus for switching channels enters a waiting mode or stays in the waiting mode, and if the PID of a channel is changed, the controller 340 stores the PID of the corresponding channel. In case the apparatus for switching channels enters the waiting mode, too, an update of the PID can be carried out by one tuner.

Further, in case two or more tuners capable of searching for TPs are employed, the controller 340 can search for channel information by using an idling tuner. An idling tuner refers to a tuner not currently used, and for example, it can be a tuner not receiving a TS. For example, while one tuner is employed to receive a TS of a first channel, an idling tuner not receiving a TS can be employed to store or update PIDs by receiving channel information of other channels. Meanwhile, in case the number of idling tuners is two or more, a plurality of channel information can be received simultaneously from a plurality of TPs by using all the tuners available.

The above examples of receiving channel information by using one tuner can be carried out by using an idling tuner. For example, while receiving a TS by using one tuner, the idling tuner can be employed to receive the channel information. Also, while receiving a TS by using at least one tuner, the controller 340 may search the channels
by using an idling tuner and receive channel information and store PIDs of the channels. Also, when the apparatus for switching channels enters the waiting mode, the controller 340 can receive channel information by using the idling tuner. In these examples, too, in case the number of idling tuners is two or more, a plurality of channel information can be received at the same time from multiple TPs by using all the tuners available.

The controller 340 can receive channel information from a server by using the IP transceiver 305. The controller 340 can receive the channel information by using the IP transceiver as well as the tuner described above. For example, the controller 340 may employ the tuner to receive channel information of channels included in a TP to which currently switching channels or channels under reception belong and to update PIDs while the controller 340 may utilize the IP transceiver 305 to receive channel information of channels included in other TPs but the TP and to update the PIDs.

Furthermore, the controller 340 can receive channel information by using only the IP transceiver without employing a tuner. For example, in case the tuner is not in good reception conditions or no idling tuner is available, the controller 340 can receive channel information from a server of a broadcasting station by using the IP transceiver and obtain PIDs. For example, the controller 340 may receive channel information of a TP to which a TS-receiving channel belongs by using the IP transceiver 305 or receive channel information of the whole TPs. In this case, the controller 340 can transmit to the server a request inquiring about whether the PID of a particular channel has been changed, and the server, in response to the request, can transmit only the PID information of a channel, the PID of which has been changed to the apparatus for switching channels. In case no channel shows the PID change, the server may not reply to the request at all. The controller 340 receives only the PID information of the channel, the PID of which has been changed, changes the PID, and stores the changed PID. The
request inquiring of PID change transmitted to the server by the controller 340 may include information about time at which the PID is updated in the apparatus for switching channels. Therefore, the server can transmit the PID of a channel, the PID of which has been changed, to the apparatus for switching channels after the update time.

An apparatus for switching channels according to one embodiment of the present invention can store PID information of a plurality of elementary streams (ESs) included in a plurality of TSs in the PSI managing unit 340 beforehand by using a plurality of tuners. To be more specific, the PSI managing unit 330 obtains PSI from the obtained TS and extracts PMT of the corresponding channel from the PAT of the obtained PSI. And the PSI managing unit 330 extracts PIDs within the extracted PMT. Then the PSI managing unit 330 provides the extracted PID according to a request of the controller 340. In other words, the PSI managing unit 330 extracts PIDs from PSI information of a plurality of TSs independently of channel switching and stores the extracted PIDs. The controller 340, at the time of channel switching, requests from the PSI managing unit 330 the PID of a channel to switch, and the PSI managing unit 330 provides the PID of the corresponding channel according to a request of the controller 340. The controller 340 can extract audio and video data by using the PID received from the PSI managing unit 330. In this case, a series of processes for the controller 340 to extract PIDs from a TS at the time of channel switching may be skipped. In other words, the time required for switching channels can be reduced.

The PSI is a value which can be changed as time passes; in the case of a set-top box equipped with a plurality of tuners, PID information of an ES (Elementary Stream) can be extracted periodically by receiving at least one of PSI data of the whole TPs searched by employing the resources of tuners not in use. Thus, it is made possible to perform receiving a TS by using a particular tuner while other tuners are
used to extract channel information such as PSI, PAT, PMT, or PID information of other TSs.

Meanwhile, if the number of tuners capable of searching for other TPs is two or more, a plurality of channel information can be extracted at the same time from multiple TPs by using all of the available tuners. At this time, the extracted information may include all the information to reduce the time required for channel switching. For example, the extracted information may include SI (System Information), PSI (Program Specific Information), and so on.

The extracted channel information can be stored in the RAM or flash memory though not shown in FIG. 3 but included in the apparatus for switching channels. The controller 340, by using channel information stored in the RAM or flash memory, can play audio and video by performing AV filtering immediately after tuning of the tuner without extracting PIDs at the time of channel switching.

In another embodiment of the present invention, the PSI information generated at the TS generator 100 and transmitted to the TS receiver 300 can further comprise at least one of PSI_other, PAT_other, PMT_other, and PID_other. Here the PSI_other is a PSI set of at least one other TS not belonging to the corresponding TS. In the same manner, PAT_other is a parameter representing the PAT value of at least one other TS rather than the corresponding TS and refers to a set of such parameters. PMT_other is a parameter representing the PMT value of at least one other TS rather than the corresponding TS and refers to a set of such parameters. PID_other is also a parameter representing the PID value of at least one other TS rather than the corresponding TS and refers to a set of such parameters. In this case, though a plurality of tuners may not be used, the apparatus for switching channels can extract PSI, PAT, PMT, or PID of other TP from the corresponding TS along with reception of the corresponding TS. For
example, while receiving a TS by using one tuner, the apparatus for switching channels can receive at least one of PSI_other, PAT_other, PMT_other, and PID_other, which can be received by using an idling tuner or from a server by using the IP transceiver 305.

In what follows, a method for switching channels according to one embodiment of the present invention will be described. From the descriptions below, the structure and operation of the apparatus for switching channels will also be more clearly understood.

FIG. 4 is a flow diagram of a method for switching channels according to one embodiment of the present invention.

First, as shown in FIG. 4, the tuner 320, in response to the control of the controller, tunes a received signal to a frequency band of a particular TP S410. Due to the tuning, a particular TS is obtained. The PSI managing unit 330 extracts PSI from the TS and extracts PID from the extracted PSI S420. Next, the controller 340 extracts audio and video data from the TS by using the PID extracted from the PSI managing unit 330; and proceeds streaming of media by displaying the extracted audio and video data in the output unit 350.

Next, the PSI managing unit 330 re-obtains PSI information of other channels in the middle of media data streaming S440. And the PSI managing unit 330 extracts PIDs from the obtained PSI information. When using a plurality of tuners, the apparatus for switching channels according to one embodiment of the present invention can obtain information of other channels by using an idling tuner in addition to the tuner receiving a particular TS for streaming of media data. Also, the S440 step can be carried out at regular intervals.

The re-obtaining PSI information at the step of S440 is just an example; the
channel information obtained again by the PSI managing unit may include SI, PAT, PMT, PID, and other information as well as PSI. The PID, being included in the PAT or PMT, can be delivered from the TS generator 100 to the TS receiver 300.

As the TS under reception includes PSI_other, which carries information about a plurality of channels except for channel information of a channel being received, in addition to the existing PSI, the step of S440 can be carried out to obtain PSI_other. In this case, no separate tuner is required to obtain channel information of other channels.

In a similar manner, the step of S440 can be carried out to obtain at least one of PAT_other, PMT_other, and PID_other as at least one of PAT_other, PMT_other, and PID_other is included in the TS. PAT_other is a set expression of PAT, which can be expressed in the form of an array, list, and the like. Similarly, PMT_other and PID_other can also be expressed as a set of PMTs and PIDs.

Also, PSI included in the TS may include all the PSI of other TSs. In this case, an actual field may be introduced to distinguish the corresponding PSI of the TS from the PSI of other TSs. At this time, the PSI can be included in the TS in the form of an array, list, and the like. In a similar manner, any one of PAT, PMT, and PID can be included in the TS along with PAT, PMT, and PID information of other TSs, and at this time, the actual field, which distinguishes the PAT, PMT, and PID information of the TS from the PAT, PMT, and PID information of other TSs, can be included therein together.

In this case, an actual field meant for distinguishing information of the TS from the information of other TSs may not be used; to identify information of the TS, the corresponding information of the TS may be placed at a specific position among a plurality of PSI, PAT, PMT, PID, and other information.

Finally, in case a channel switching signal is generated, audio and video data are extracted from the TS of a channel switched by using the PID extracted by
employing the PSI information re-obtained before receiving the channel switching signal S450. The channel information obtained in the step of re-obtaining channel information S440 can be stored in the memory. In this case, the re-obtained PSI can use the PSI stored in the memory. Receiving the channel switching signal can be carried out by receiving the user’s channel switching input triggered as the TS receiver 300 displays channel information on the display unit.

In what follows, structure of PAT and PMT according to one embodiment of the present invention will be described. FIG. 5 illustrates the conventional PAT. FIG. 6 illustrates the conventional PMT. FIG. 7 illustrates a transport_stream_id according to one embodiment of the present invention. FIG. 8 illustrates a PAT according to another embodiment of the present invention. FIG. 9 illustrates a PMT according to one embodiment of the present invention.

With reference to FIG. 5, PAT contains a transport_stream_id field representing the ID of a TS. The structure of the conventional PAT is unable to represent information of other TS. FIG. 7 illustrates a transport_stream_id according to one embodiment of the present invention. The transport_stream_id according to one embodiment of the present invention can be constructed in various ways. For example, with reference to the transport_stream_id of FIG. 7, an Actual_transport_stream_flag representing the ID of the corresponding TS appears first, and the IDs of other TSs follow the flag in a sequential order of transport_stream_id1, transport_stream_id2, …, transport_stream_idn.

With reference to FIG. 8, PAT according to one embodiment of the present invention further includes an Actual_transport_stream_flag and includes a revised
Transport_stream_id field. In the PAT according to one embodiment of the present invention, the Transport_stream_id field includes both the ID of a current TS and the ID of other TS. In other words, including IDs of a plurality of TSs enables a receiver of the TS to obtain IDs of other TSs without receiving other TSs. Therefore, a TS receiving apparatus doesn’t have to make a tuner tuned to the frequency band of other TP to obtain information of the TS. The Actual_transport_stream_flag is a flag representing the ID of the corresponding TS. The flag specifies at which position of the Transport_stream_id the ID of the TS is located. Various methods may be used for this end; in case the Transport_stream_id is an array, the Actual_transport_stream_id specifies in the form of an index at which cell of the array the ID of the TS is located. Or the Actual_transport_stream_id can be made to represent the ID of the corresponding TS while the Transport_stream_id is made to represent IDs of other TSs.

FIG. 6 illustrates the conventional PMT. With reference to FIG. 6, since the conventional PMT is transported and received together with an associated PAT in a TS, the conventional PMT does not include a field representing the ID of an associated TS.

FIG. 9 illustrates a PMT according to one embodiment of the present invention. The PMT according to one embodiment of the present invention further includes Transport_stream_id. Since a plurality of Transport_stream_ids are transported to carry out a method for switching channels according to one embodiment of the present invention, the PMT marks the matched Transport_stream_id.

Also, in a method for switching channels according to a second embodiment of the present invention, PMTs belonging to other TSs may be transported being included in a TS. In this case, to indicate the PMTs related to the corresponding TSs, each PMT needs to further include the Transport_stream_id.
In a method for switching channels according to a third embodiment of the present invention, a PMT may include multiple program_numbers and PIDs of ESs (elementary_PIDs) as a PAT includes multiple IDs of TSs.

In a method for switching channels according to a fourth embodiment of the present invention, PATs and PMTs belonging to TSs different from each other are configured to further include Transport_stream_id fields to indicate the IDs of the respective TSs and can be included in one TS. In this case, a plurality of PATs not belonging to the corresponding TS are included in the TS being configured in the form of PAT_other; in the same way, a plurality of PMTs not belonging to the corresponding TS can be included in the TS being configured in the form of PMT_other. Also, the aforementioned PAT and PMT can be compressed before being constructed.

Though this document provides descriptions of the present invention based on a series of functional blocks, the present invention are not limited to the above embodiments and appended drawings, but it should be clearly understood to those skilled in the art to which the present invention belongs that various substitutions, modifications, and changes can be made to the embodiments without departing from the technical scope of the present invention.

Combinations of the embodiments described above are not limited to the examples of this document. Rather, combinations of various other forms as well as the aforementioned embodiments can be made according to implementation and/or needs.

In the embodiments described above, although methods have been described through a series of steps or a block diagram, the present invention is not limited to the order of steps and some step can be carried out in a different order and as a different step from what has been described above, or some step can be carried out
simultaneously with other steps. Also, it should be understood by those skilled in the art that those steps described in the flow diagram are not exclusive; other steps can be incorporated to those steps; or one or more steps of the flow diagram can be removed without affecting the technical scope of the present invention.

The embodiments described above include various forms of examples. Though it may be impossible to describe all the possible combinations to illustrate the various other forms, it should be understood by those skilled in the art that other combinations are possible. Therefore, it should be understood that the present invention includes all of the other substitutions, modifications, and changes belonging to the technical scope defined by the appended claims.

A method and apparatus for switching channels according to embodiments of the present invention described above stores channel information such as PSI or PID prior to channel switching and generates audio and video data of a switched channel by using the stored channel information. Thus the present invention removes a process of calculating channel information such as PSI or PID of a channel to be switched to at the time of channel switching, thereby achieving the effect of reducing channel zapping time.
What is claimed is:

1. In a method for switching channels carried out by a media play apparatus, a method, comprising:
   - obtaining information about a plurality of channels;
   - receiving a channel switching signal; and
   - generating channel data according to the channel switching signal by using the obtained channel information.

2. The method of claim 1, wherein the obtaining information about a plurality of channels comprises obtaining channel information by using at least one idling tuner among a plurality of tuners.

3. The method of claim 2, wherein the obtaining channel information by using at least one idling tuner among a plurality of tuners comprises obtaining channel information of a channel not included in a transport stream under reception.

4. The method of claim 1, wherein the channel information is transported being contained in a program association table (PAT) or program map table (PMT) including identifiers for a plurality of transport streams.

5. The method of claim 1, wherein The PAT or PMT further includes an identifier indicating a transport stream in which the PAT or PMT is included.

6. The method of claim 1, wherein the channel information is transported being contained in a PAT or PMT of a transport stream, and the channel information further
includes channel information of a channel contained in another transport stream.

7. The method of claim 1, wherein the obtaining information of a plurality of channels comprises obtaining channel information by using an IP network.

8. The method of claim 1, wherein the obtaining information about a plurality of channels comprises

receiving channel information from a transport stream received by using a tuner;

and

receiving channel information of a channel not included in the transport stream from a server by using an IP network.

9. In an apparatus for switching channels of a media play apparatus, an apparatus, comprising:

at least one tuner obtaining information about a plurality of channels; and

a controller extracting channel information from the channel data and generating channel data according to a received channel switching signal by using the previously obtained channel information.

10. The apparatus of claim 9, wherein the channel information is obtained by using at least one idling tuner.

11. The apparatus of claim 10, wherein the idling tuner obtains channel information of a channel not included in a transport stream under reception.
12. The apparatus of claim 9, wherein the channel information is transported being contained in a PAT or PMT including identifiers of a plurality of transport streams.

13. The apparatus of claim 9, wherein the channel information corresponds to a PAT or PMT which includes only channel information of a channel contained in another transport stream.

14. The apparatus of claim 9, wherein the channel information is a PAT or PMT which further includes channel information of a channel included in another transport stream, and the PAT or PMT further includes an identifier indicating a transport stream in which the PAT or PMT is included.

15. The apparatus of claim 9, further comprising an IP transceiver which receives channel information from a server by using an IP network.

16. The apparatus of claim 15, wherein the IP transceiver receives channel information of a channel from a server, the channel being not included in a transport stream received through the tuner.

17. The apparatus of claim 9, further comprising memory in which obtained channel information is stored, and wherein the controller stores the obtained channel information in the memory when channel information stored in the memory is different from the obtained channel information and performs channel switching according to the channel switching signal by using the channel information stored in the memory.
18. In a media data transport packet, a media data transport packet, comprising transport stream identifiers for a plurality of media data.

19. The media data transport packet of claim 18, wherein a PAT or PMT is included, and the PAT or PMT includes the transport stream identifiers for a plurality of media data.

20. The media data transport packet of claim 18, wherein a plurality of PATs or PMTs are included, and the PAT or PMT each includes the transport stream identifier for a plurality of media data.
ABSTRACT

The present invention provides a method and apparatus for switching channels to reduce channel zapping time, which use channel information generated prior to channel switching and generates audio and video data of a switched channel, thereby skipping a process of calculating channel information of a channel to be switched at the time of channel switching.
FIG. 1

300

201

200

.transport stream

100

101

Mux

100a

100b

100c

100d

100e

Movie

Audio

Video

Data

News cast

Audio

Video

Data

Sports Program

Audio

Video

Data

Data Tables

Program Map Table (PMT)

Electronic Program Guide (EPG)

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<th>ONID-TID APID Lang.</th>
<th>Beam EIRP (dBW) C/N lock</th>
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<td>Canal+</td>
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<td>92 Sp</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The EIRP values are for South Korea.

FIG. 3
FIG. 4

- Start
- Tune to frequency bands
- Obtain PSI
- Streaming
- Re-obtain PSI
- Channel switching by using the re-obtained PSI
- End
syntax

Program_association_section()
    table_id
    section_syntax_indicator
    '0'
    reserved
    section_length
    transport_stream_id
    reserved
    version_number
    current_next_indicator
    section_number
    last_section_number
    for ( j=0; j<n ; j++ ){
        program_number
        reserved
        if(program_number=='0'){
            network_PID
        }
        else{
            Program_map_PID
        }
    }
    CRC_32
syntax

```c
TS_program_map_section()
{
    table_id
    section_syntax_indicator
    '0'
    reserved
    section_length
    program_number
    reserved
    version_number
    current_next_indicator
    section_number
    last_section_number
    reserved
    PCR_PID
    reserved
    Program_info_length
    for ( i=0; i<N1 ; i++){
        descriptor()
    }

    for ( i=0; i<N2 ; i++){
        stream_type
        reserved
        elementary_PID
        reserved
        ES_info_length
        for ( j=0; j<N12 ; j++){
            descriptor()
        }
    }
    CRC_32
}
```
| Actual_transport_stream_flag | Transport_stream_id1 | Transport_stream_id2 | ... | Transport_stream_idn |
syntax

Program_association_section(){
    table_id
    section_syntax_indicator
    '0'
    reserved
    section_length
    transport_stream_id
    actual_transport_stream_flag
    reserved
    version_number
    current_next_indicator
    section_number
    last_section_number
    for ( j=0; j<n ; j++ ){
        program_number
        reserved
        if(program_number==0){
            network_PID
        } else{
            Program_map_PID
        }
    }
    CRC_32
}
FIG. 9

<table>
<thead>
<tr>
<th>syntax</th>
</tr>
</thead>
</table>
| TS_program_map_section(){
  table_id
  section_syntax_indicator '0'
  reserved
  section_length
  transport_stream_id
  program_number
  reserved
  version_number
  current_next_indicator
  section_number
  last_section_number
  reserved
  PCR_PID
  reserved
  Program_info_length
  for ( i=0; i<N ; i++){  
    descriptor()
  }
  for ( i=0; i<N1 ; i++){  
    stream_type
    reserved
    elementary_PID
    reserved
    ES_info_length
    for ( j=0; j<N2 ; j++){  
      descriptor()
    }
  }
  CRC_32
} |